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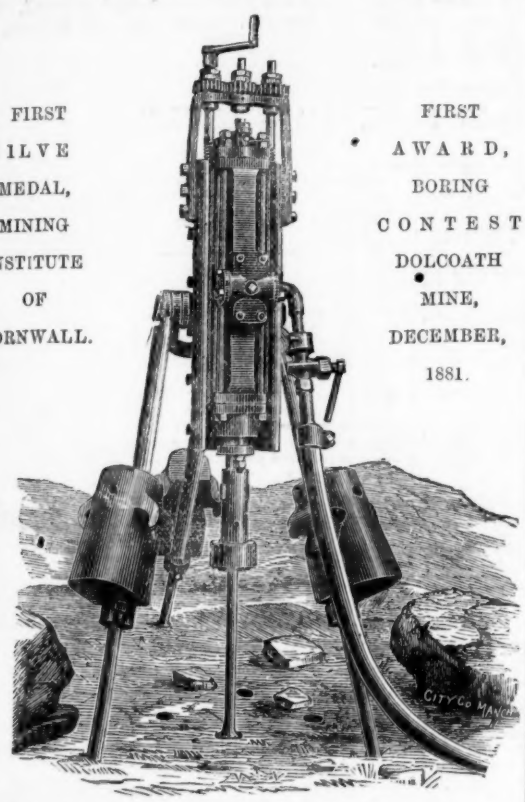

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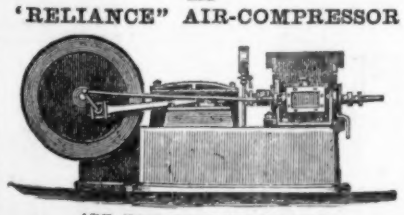

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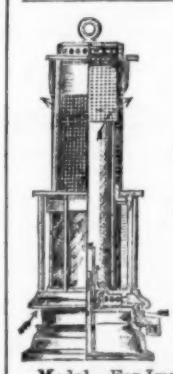

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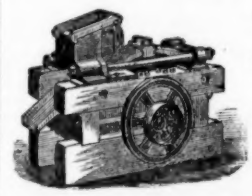

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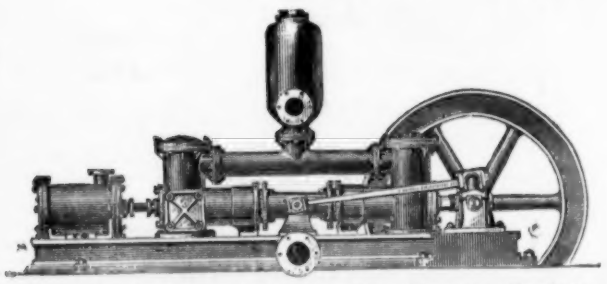

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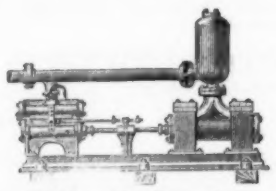

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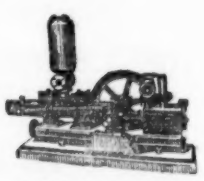

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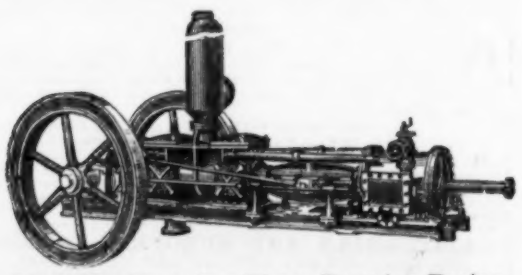

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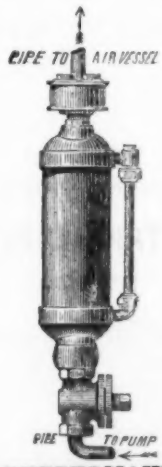

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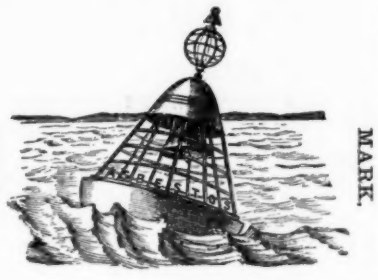
TRADE  MARK.

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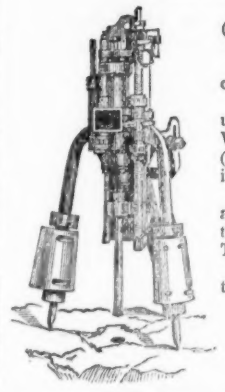

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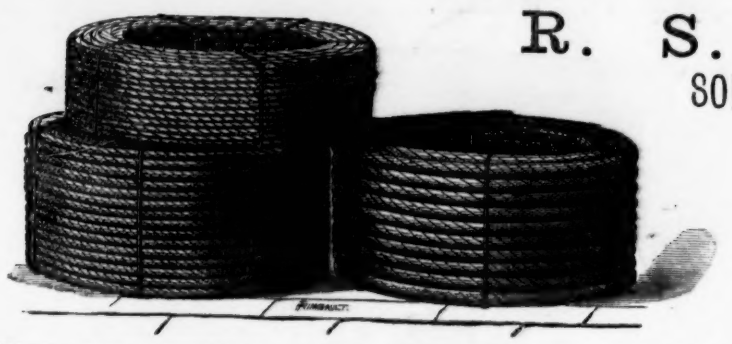

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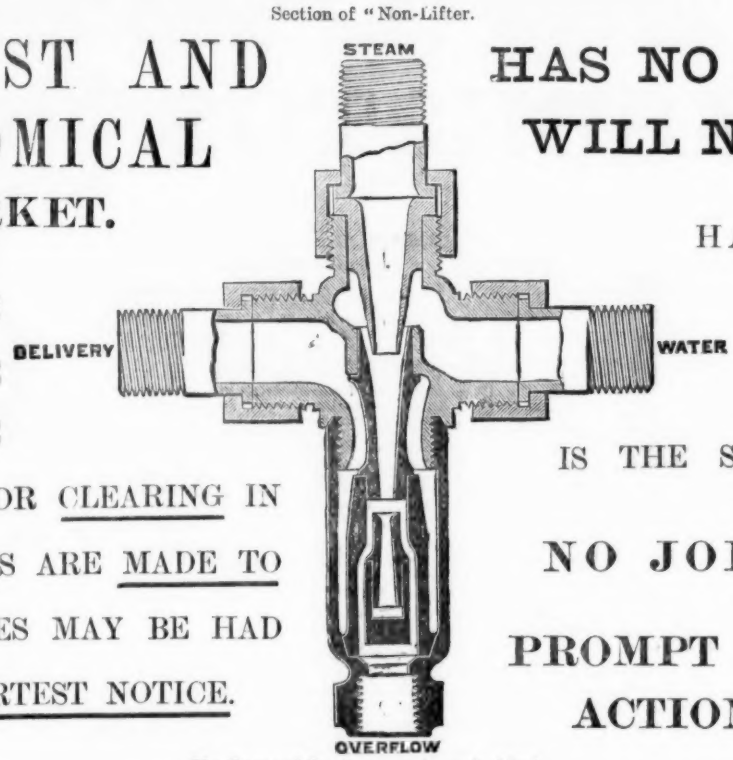

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N.B.—PRICE LISTS ON APPLICATION.

AFRICAN GOLD COAST MINING COMPANY.—A despatch from Cape Coast Castle (Feb. 17) states that between the night of Jan. 2 and the following morning, Mr. John Barrow, the European accountant of the company, was brutally murdered at Aboossu, in Wassau, and 90*l.* in specie was stolen from the safe. Four men, natives of Elmina—three in the employ of the company and one recently dismissed—are arrested, and had been heard to utter threats against the life of the deceased. Their trial would probably commence on March 5.

ANGLO-POLISH LEXICON.—It appears that the difficulty of finding an English printer with a sufficiency of Polish type to print a lexicon caused considerable delay in the issue of this lexicon, long since announced in the *Mining Journal* as ready for the press, and it was not until Dr. Baranowski secured the co-operation of Messrs. Lesman and Swiszczowski, of Warsaw, as publishers, that the subscribers could be given the advantage of the author's labours. The work, however, is now issued, and upon Messrs. Lesman and Swiszczowski's suggestion has been extended and improved in several respects. It now consists of about 500 pages, and affords all the information necessary to enable the student to acquire a fair mastery of one of the most musical languages of Europe. The first part embraces a general key to the pronunciation of Polish letters and syllables, an outline of the grammatical rules, and a lexicon of all the words most frequently used in conversation and correspondence, with the pronunciation of the Polish indicated by English equivalents; whilst the second part contains short English phrases translated into Polish, ordinary social and domestic dialogues, and translations of English and Polish proverbs. The lexicon will certainly add to Dr. Baranowski's already high literary reputation and will be of the utmost possible utility to students.

SPONTANEOUS COMBUSTION OF COAL.—A useful little pamphlet entitled "Some Facts connected with Spontaneous Combustion of Coal in Cargoes: their practical application to prevent loss of lives and vessels," has just been issued by Mr. Thos. Rowan London: Author, Palace Chambers, S. W.), in which he states that the larger the cargo the greater is the liability to spontaneous combustion, and that the average time has been found to be 60 days from leaving port before spontaneous combustion takes place. He suggests that tubes enclosing electrical thermometers should be placed at different levels amongst the coal.

ESTABLISHED 1825.

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Original Correspondence.

SOUBACK AND CATIR ALAN MINING COMPANY.

SIR,—In perusing my speech at the general meeting of this company, as reported in last week's *Mining Journal*, I notice several errors, commencing with "I got a letter from Mr. Lemmi." The text should be dated Feb. 10. with this sample (produced) sent by post, stating that in the cross-cut we had struck the vein at a distance of 77 ft. He was now taking the stuff out of the vein. He found that the first specimen contained native gold, and he then immediately went down into the mine to see the ore taken out himself, and to make arrangements for its being sent up under inspection. He had already extracted and packed in cases 2½ cwts., all of which contained good veins. I also stated in my report that as we get down the mine became richer. Thus in the cross-cut, at a depth of 60 ft. below our present workings, it has quite fulfilled my expectations, the vein at that depth being considerably richer than it was above; and not only is the ore richer, but we have found therein veins of native gold.

The cross-cut was driven to the west of the present workings, and on the other side of the mountain, at 700 ft. to the east of the said workings, we have tried a vein, which I conceived to be the same. I found it contained 2½ ozs. of gold per ton in the first sample, and I am quite convinced that it is the same vein, so that we have this rich vein extending for 700 ft. I have given you an instance of my having been right to the west of our present workings; let us hope that I may be right on the other side also. I believe the rich vein will be found to continue right through the mountain, and will everywhere yield from 2 ozs. to 200 ozs. of gold per ton. It varies very much, but I think we may expect an improved average quality as we drive further into the mountain. I am reported to have said that the rich vein contains from 200 to 220 ozs. of gold to the ton, whilst I did say the rich vein contains from 2 ozs. to 200 ozs. of gold per ton, and 10 times that quantity of silver. The remainder is reported as stated by me. C. E. AUSTIN.

Westminster Chambers, March 21.

THE GOLD AND DIAMOND FIELDS OF SOUTH AFRICA.

SIR,—The large number of wagons continually leaving this place laden with clerks, artisans, and miners tells its own tale. Should the amalgamation of all the companies take place all the local diamond brokers who have hitherto been the life and soul of this place will have to leave, and the majority of business men will be irretrievably ruined. If the white population are driven from the place the Kimberley Waterworks Company might as well close, as the quantity of water that would be required for the mines alone would scarcely meet the expense of fuel. It will be remembered that I have continually condemned the Mining Board, and I am more fully convinced than ever that they have been the ruin of this place. They have been so blinded by individual interest, that the general interest of the place has been sacrificed to their own cupidity—on which, however, one or two has happened to trip. In all kinds of mining there is good and bad ground, and the Kimberley diamond formation is no exception. It is simply monstrous that the owners of unprofitable ground should have the power to rob (I can call it nothing else) the owners of good ground. If any company cannot work successfully on its own merits let it go to the wall the same as in any other country. It would be better for every person in the end, and do much toward preserving the credit of the place—that is if we have any left. Money is so tight that I know of many cases where it is being lent out at 7 and 8 per cent. per month.

The Central Company's shares are saleable at about 5 per cent. premium. The British are selling at par, but they will in my opinion go down 20 per cent. below par before they are clear of reef. The Standard, which is really a good company, is selling 60 per cent. below par, but this is owing to their trouble with reef. Illicit diamond buying is on the increase, and last week two worthies were taken in charge with 56 ozs. in their possession. The white overseers refuse to submit to be searched, and many have given notice to leave. In consequence of the great slaughter of blacks around the Transvaal there is great scarcity of native labour, and altogether our cup of bitterness seems well nigh full. Nearly all the companies in Dutoitspan and Bultfontein are suffering through being so heavily handicapped. The north side companies in De Beers are doing fairly well, but all the others appear to be in the last throes. There is nothing doing at Kamfersdam, Saltpeterpan, or St. Augustines. The diamond which was found about 50 miles from here three weeks ago is said to have been sold at Hope Town for 1000*l*. The news from Jagersfontein is of a decidedly encouraging character, and many of the old diggers say it will be the mine of the future. Koffyfontein is a very promising mine, but there is not much doing there at present.

Gold is not confined to the Transvaal, and the Town Council of Port Elizabeth have passed a resolution for the discovery of a rich field within 100 miles of the town office. An old Australian digger who has just returned from the Transvaal has undertaken the job at a moderate price. In the Transvaal everything appears to be going from bad to worse, and notwithstanding the daily finding of a fabulously rich gold field each richer than its predecessor, everybody is idle and hard up. The people sigh after English coin; and unscrupulous adventurers and one or two faithless missionaries are continually concocting bubble schemes, which, under the influence of grog, are always to put things straight and fill everybody's pockets.

There is a report that another gold field has been found at the Kaap, and notwithstanding its fabulous richness the discoverers are paying great attention to getting the Government reward instead of marking out claims. Such disinterestedness might appear meritorious if it were not for the fact that they can find others equally rich whenever they desire to do so. Little confidence, however, is placed in the originators of many of the mineral discoveries in the Transvaal, and honest men are beginning to avoid the place as they would a pestilence. In one or two of the old diggings that are under offer in England the owners have stripped off the clay-slate from the side of one or two strings of quartz, so that they are standing up somewhat showey, but very little thicker than a coating of plaster on a wall. This is transparent to experienced hands, but is often successful with inexperienced "new chums." If the various attempts at rascality in this country were successfully carried out it would only enable a few adventurers to clear out successfully at the expense of South Africa generally. I hope, therefore, that none of your contemporaries will censure me for endeavouring to guard the true interests of South Africa as well as the pockets of the hated English. I have always pointed out that since the Boers got the Transvaal back neither the life or property of loyal Englishmen were safe.

The Transvaal Mineral and Smelting Works are to be completed by the time the Delagoa Bay Railway reaches Pretoria. This will give the mason-work plenty of time to settle, because I have not the least doubt that long before the line reaches Pretoria railways will be superseded by some other more expeditious mode of transit. I notice some writers in the home papers speak of the Transvaal as the healthiest place in South Africa. This is not correct. Some parts are healthy, but others are very liable to fever, and some districts are so full of fever that Europeans cannot live in them, and in consequence the land is not worth anything. Persons who have land for sale say it is a good agricultural country, yet at present all the flour used in the interior is brought from Australia. Sheep will not do well in the Transvaal, and for several months in the year the life of no horse is worth 24 hours purchase.

In fact this Province of Griqualand is infinitely superior in every respect to the Transvaal, and when the railway has been opened from Cape Town to this place it will be a very suitable place for emigrants of the farm-labour class. It would be a good thing for South Africa if a payable gold field were discovered, but the fact of nearly all the able-bodied men leaving the colony who are able to do so is a proof that such a thing is not known to exist. The Advertiser, referring to this matter, says—"The number of men who leave almost daily by wagon tells a tale of want of work and no prospect of any." Would this be the case if the Transvaal was so rich in gold as a few unscrupulous adventurers would have us believe? I have seen so much of the misery caused by what are known as "blind rushes" that I feel it a duty to caution persons against the Transvaal. As I have always remarked, the samples found in the Transvaal are of a character to ruin the unwary, but as a gold field it is not worth the name. Flash reports will not make a gold field any more than adverse criticism will injure it. But the various diggings having been worked for 12 years without any satisfactory result is a proof that they are of little or no value. I have continually pointed out that the indiscriminate slaughter of blacks by the Boer Government was likely to cause a general rising of the Kaffirs throughout Africa. I am still of the same opinion, and if by the time this reaches you the blacks have not turned the tables on the bloodthirsty Boer savages I shall be very much mistaken. It is said that from every point of the compass the blacks sigh for the return of British influence.

Kimberley, Feb. 16. —— CORRESPONDENT.

GOLD COAST COMPANY.

SIR,—As your correspondent "M. E." mentions the part taken by me with the assistance of Mr. Thorne and Mr. Shea in protecting the shareholders' interest, allow me to say that I should have been more gratified if the directors had contrived to get the other half of the property. After what has passed I hope the board will keep a sharp look out, and not be induced to enter into any such agreement before first consulting the shareholders so as to give them an opportunity of stating any facts which they may consider prejudicial to the interest of this company, I hope also that the directors will now abandon the so-called sale of part of our property, but I think it would be as well to sell the newly purchased at the price named at the meeting—75,000*l*.

I fancy if more of the directors resided in London the affairs of this concern might be more closely looked after, and, therefore, any projects against our interest more easily defeated. My having a seat at the board will have to remain a wish of "M. E." and other shareholders, the part I took in the late proceedings having no doubt offended some of its members. S.

Grosvenor Mansions, March 22.

GOLD COAST MINING COMPANY.

SIR,—In connection with the "origin and management" of this company, no doubt many errors have been made; but the shareholders who are acting with me have demanded that the Articles of Association shall be modified in several important particulars, and that the next two vacant seats on the board shall not be filled up until they have been consulted as to the proposed appointments. The directors are under promise to modify the objectionable Articles: and I apprehend this will be done within a reasonable time, say within six weeks or two months at the furthest. With regard to the vacancy caused by the retirement of Mr. Irvine, the directors are, I understand, disposed to appoint a gentleman, the holder in his own name of 600 shares, and through a near relative (a lady) of 300 shares. If this appointment is made at an early meeting of the board, and the Articles are satisfactorily amended, I think a great step will have been gained for the proper future management and conduct of the company's business. There is no doubt that we have got a very valuable property, and I should much regret to see any discussion in a public journal as to the internal management of the company's business, if such discussion would (in consequence of the concessions and alterations made) be likely not only to be useless, but in some respects even inimical to the best interests of the shareholders.

London, March 21. —— JAMES THORNE.

MINING ON THE GOLD COAST.

SIR,—I regret that many who, like myself, purchased shares in mines on the Gold Coast have in one short year become so utterly discontented with their investments. I am writing more particularly of the Guinea Coast Gold Mining Company, a report of the yearly meeting of which recently appeared in the *Mining Journal*, but my remarks are almost equally true respecting the shareholders in the Gold Coast Company. These latter, however, appear to be now working amicably once more, and if they will only wait patiently I firmly believe their reward will exceed the most sanguine expectations. I may here remark that no person should invest in a mine of any description unless he can spare the money he is venturing without affecting his income, and unless he has thoroughly made up his mind to wait patiently for results.

The reports made by Mr. Walker, Mr. Paulus Dahse, and Captain Burton in 1881, as to the prospects of mining on the Gold Coast are as true now as when they were uttered, and nothing has occurred since as affecting those gentlemen to cause the shareholders in the above mines and the general public to lose faith in them. It is true that the Guinea Coast Company have been most unfortunate in losing by death the services of Mr. Francis and Mr. Robertson, the former by an attack of sunstroke, and the latter by dysentery; but these losses, although most deplorable, are not irreparable, and there is certainly no reason that the company should collapse, as some people seem to think inevitable. On the contrary, it will cause the directors to put their shoulders to the wheel, overhaul the entire management, and impress on their employees the absolute necessity of taking every precaution against the climate and to avoid excess of any kind. At the general meeting of the Guinea Coast Company to which I have referred, some shareholders seemed to imagine that the company had not sufficient funds in hand to carry on operations for any length of time; but with nearly 15,000*l*. in cash and securities, besides stores, provisions, implements, &c., representing some 2000*l*. more, and with 25,000*l*. unissued shares, to which no reference seems to have been made, I venture to predict that with proper management and a judicious selection of labourers for the mine that the company has a good future before it, and stands an equal chance of success with the Gold Coast Company.

I may add, in conclusion, that although induced by the representations of Captain Burton and Mr. Walker (in which I still most firmly believe) to purchase shares, I also consulted a military friend of mine who was stationed at Gold Coast Castle for some years, and who told me that there is undoubtedly very large quantities of gold there, especially in the Appolonia district, and that he had no doubt that with proper management and labour they would result most advantageously for the shareholders. R.

Manchester, March 19.

TIN MINING IN NEW SOUTH WALES.

SIR,—As was the case with gold mining, when working the alluvial was the foster nurse of quartz mining, and working the deep wet levels with machinery—so now that many of the richest surface patches of stream tin are worked out, attention is being bestowed both on sinking for the alluvial through and under the overlying basalt, and also in the lodes themselves, and although we have doubtless much to learn as to the proper—or at least the best—way of crushing and saving the ores, still the matrix is so rich generally speaking that we can afford to work them, and yet to pay for learning the best method whilst working.

I saw some tinstone from the Planet Company's ground (formerly an English proprietary, which abounded the mine, without even giving it a fair trial) which assayed 60 per cent. metallic tin, and I have seen assays of several other lodes from 15 up to 40 per cent. metallic tin.

TIN MINING AT DUTCHMAN'S REEF, TABLE LAND.—A correspondent writes, Jan. 20:—The reefs on this part of the district are looking well. The Dutchman's tunnel is still being driven by Martin and party. They are on the course of the lode, which varies in size from 1 ft. up to 5 ft., carrying splendid tin; in fact it is one of the best lodes in the colony. If the Great Britain Company were to erect a battery they could get stone enough to keep the stamp going from this claim and Curnow's lode, which is being driven on at two different levels, 100 ft. and 30 ft., the drives going in opposite directions. The drive at the 100 ft. contains a lode 4 ft. 6 in. wide, carrying good tin so far as they have gone. At the 130 ft. level there are a pare of men cutting a flat and opening out on the lode, which is 5 ft. wide and rich with tin. The lode at the bottom of the shaft is 3 ft. 6 in. wide; it is a keen-looking lode, but not much tin showing. Sinking is stopped; the depth is 181 ft. It is a very rough shaft, and wants to be cut down and timbered before they can use it for much hauling out with machinery. Trewhella and party, of the Wallaroo Mine, are washing up some of their stone, which is looking very well, but the stone wants to be put through a battery in order to extract all the tin, the process of burning and bucking and jigging being too slow for hard stone. The lode still looks well going down, in fact it is a grand lode. The Torrington Company's battery has arrived, and is partly erected. It may shortly be expected to start crushing. This mine is not looking quite so well as it was some time ago. There is not any regular or defined lode, nothing but bunches of rich ore here and there. The Nine-mile is something the same, very patchy. More about the lodes next time.

In Queensland also their prospects are very bright as the following extract shows:—

TIN MINING.—That the present year bids fair (says the Stanthorpe Miner) to be a more progressive one for Stanthorpe than the past, few will dispute, and we are not by any means singular in predicting a far more prosperous and permanent aspect of affairs a few months hence. The ground upon which this opinion is based needs no explanation to our local readers, and many at a distance have already become aware that the mineral resources of the district are not confined to deposits of alluvial tin. That the country abounds in rich and extensive lodes is now fully acknowledged even by those who 12 months since ridiculed the idea and prophesied an early collapse for Stanthorpe, consequent upon the exhaustion of the principal sources of stream tin. From Port Darwin news is to hand; the Townsville Bulletin says that Mr. Daniels reports the finding of two new tin lodes at Mount Wells, which will be prospected this month. He says that the whole mount seems to be one mass of tin lodes and leaders. Saunders and party have discovered a likely looking lode, showing good ore north of Mount Wells, near the Pioneer boundary, and the lode can be traced into the Pioneer ground. The whole appearance of the Mount Wells selections is most encouraging. Another prospector says—"This Mount Wells is a grand property; lode everywhere on it—in fact it is all tin; a second Mount Bischoff."

If English skill and experience in tin lode mining were only brought to bear in New South Wales there are doubtless scores of lodes would pay for working which we look on as too poor.

Sydney, February. —— R. D. A.

NATIVE COPPER MINING ON LAKE SUPERIOR.

SIR,—In the Journal of the 3rd inst. it is stated that the report of the Osceola Consolidated Mining Company for 1882 shows that the product of the mine for the year was 4,176,782 lbs. of refined copper, which realised $739,458, the mining profit being $207,437. As the mineral of this mine produces 2 per cent. of native copper, it follows that a ton of ore is worth $7·08, and the expense of production amounts to $5·09½, equal to 72 per cent. of its value. Perhaps some of your readers can explain why the expenses are so heavy.

Altrincham, March 20. —— R. MEIKLE.

TOCOPILLA MINING AND SMELTING COMPANY.

SIR,—In last week's Journal there is a letter, signed "Looker On," regarding the appointment of a superintendent to this company's property. In justice to the directors and myself I must state that after being informed (in a preliminary interview with the secretary) that there were upwards of 100 applicants for the post, and having figured amongst those candidates whose qualifications were I suppose considered good enough for the board's special consideration, I may say I was agreeably surprised by receiving a letter informing me that I had been selected to represent the company in Bolivia, or rather Chili; all the more so as I was not personally, and I believe indirectly, known to a single member of the board. In fact, so much has their undoubted impartiality impressed me that I have taken the opportunity of mentioning to my friends my belief that with directors so unbiassed any mining enterprise with such a basis must be a genuinely good one.

Owing to various circumstances into which I need not enter here I was unable to accept their, to me, most flattering nomination, and I have no doubt their final selection was based, as shown in my case, by the strictest impartiality. H. J. C. WILLIAMS.

Russell-road, March 21.

THE BRAZILIAN GOLD MINING COMPANY, AND PROFESSIONAL REPORTERS.

SIR,—I have been expecting to see some remarks in the Journal on the statements made by Mr. Lean at the recent meeting of the Brazilian Gold Mining Company. As I have not done so, and the circumstances under which Mr. Lean wrote a letter to you in October regarding the prospects of that company appear to me so calculated to render any similar production of doubtful value I am tempted to address a few lines to you upon it. When Mr. Lean was asked how it happened that his letter of 1880 was written in such glowing terms and his report of 1882 in so depreciatory a strain, he without the slightest hesitation replied that he was asked to write that letter by some persons interested in floating the company, that he merely expatiated on the prospectus, and that all the information contained in his letter was drawn from the prospectus.

Now admitting, as I think one easily may, the truth of this explanation, what must be said of the letter itself? Mr. Lean commences by setting forth his claim to public confidence in gold mining matters by stating his connection with Gongo Soco in definite terms, and his subsequent long experience in such as are more general. By doing so he was leading the public to look upon him as a gold mining expert. The fact being that, with trifling exceptions, his only experience in gold mining was, as he himself admitted at the meeting, obtained at Gongo Soco 50 years ago. Then, again, he writes of his familiarity with all the gold mines in that district in a manner calculated to make his readers believe that he was intimately acquainted with the several properties at the time of his writing. As a matter of fact he knew nothing about them. He then proceeds to a description of the Descuberto Mines, the property of the company, and it is couched in such language, and the sentences are so constructed as to leave the impression that it is drawn entirely from the personal knowledge of the writer. At the meeting on March 5 the public were informed, for the first time, that this account was wholly taken from the prospectus. Some quotations from the prospectus follow, and these are commented upon by this experienced (?) Brazilian gold miner as "apparently infallible data."

Obviously this letter was written by Mr. Lean to induce the public to subscribe the necessary capital, and as obviously Mr. Lean was selected because he was prepared to pose as a Brazilian gold mining expert. Had this not been so the letter might as well have been written by a lawyer's clerk. A Brazilian gold mining expert, supposed to be familiar with the property, would have a certain amount of confidence reposed in him when drawing up a letter written in a style of familiarity with the whole country, and a lawyer's clerk would not have any such confidence placed in him. This episode in gold mining promotion will, or at any rate ought, to make investors very careful how they place any confidence in letters purporting to corroborate the statements contained in prospectuses. Several new mining ventures are I see advertised, but I hope we shall not have them puffed forth by Lean letters. Naturally enough the report submitted by the writer of so misleading a letter could not have any importance attached to it, and no one at the meeting I believe placed any in it.—*Tunbridge, March* 19. VATICAN.

ROCK-BORING MACHINERY—PRACTICE AGAINST THEORY.

SIR,—In the *Mining Journal* of March 10 Messrs. McKean and Co., of Paris, write:—We will undertake to have one of our machines—a new one or a second-hand machine—reserved from the lot of 36 from the London and North Western Railway Company, without any selection on our part or choice whatever that we know of, working for a period of (say) five successive days of ten hours each in boring blocks of granite or other stone, and if such machine does not bore double the length of holes and at half the cost of repairs (if any) of any other machine that shall accept the competition, we agree to forfeit 100*l*. to any charity our competitors in the trial may name," &c.

We can understand that Messrs. McKean and Co. are desirous of selling the above-mentioned 36 machines, but in saying that any of these machines will, in a given time, bore double the length of holes of any other rock-drill, they show how little they know about the progress that has of late been made in the construction of this class of machinery, and, to prove what really can be done, we shall be glad to enter into a competition with the McKean Drill; only, we beg to make the following suggestions, in order that the trial may be a fair one:—

1.—As judges we propose that the Institution of Mechanical Engineers should select one, any of the Mining Institutions another, and each of the competitors to select one.

2.—The competing machines to be as near as possible of the same diameter, and the drill-bits to be of exactly the same diameter.

3.—The machines to do practical work in a mine—say in a level, each machine working every alternate day.

4.—The air-compressor, of whatever description it may be, to keep up the same pressure for each machine, the number of revolutions per minute to be counted and registered every half-hour.

5.—One trial to be made by filling the receiver with compressed air of a given pressure (say three atmospheres), when the air-compressor must be stopped; one rock-drill then to start, and the depth bored, the time it has taken, and the pressure in the receiver when the drill stops working to be noted and registered. The same trial then to be repeated with the other drill.

6.—Messrs. McKean and Co. to deposit the 100*l.* with the independent judges.

In section 3 we suggest that each machine should work every alternate day, because the hardness of the rock varies often considerably—for instance, in a cross-cut when approaching a vein, and it would not be fair if one machine should have to work in harder ground than the other. Messrs. McKean and Co. propose boring blocks of granite or other stone—are we to understand that they will supply these blocks? The number of holes our machine will bore during 50 hours being so great that we should require a very large block indeed, which afterwards would have very little value; it would, in our opinion, be more satisfactory to all parties if the machines are tried in some practical work in a mine.

RICHARD SCHRAM AND CO.

Northumberland-street, Charing Cross, March 20.

ROCK-BORING MACHINERY—MODIFICATIONS.

SIR,—In May and June of last year Mr. Maury, who was engineer-in-chief at the south end of the St. Gothard Tunnel from the beginning to the end of the work, gives a general review of the operations at the tunnel, and while he shows exactly what transpired as to the alterations in our machine, made by the mechanician in charge of the repair shops, he speaks in the highest terms of the principal features of the machine as it was originally offered to the enterprise. He speaks also of its remarkable qualities as to speed of boring and continuous efficiency, and, after giving a detailed description of it, arrives at the conclusion that it is for several reasons superior to any of the other systems used in the course of the works. Another fact to which we wish to call attention is the employment of our machine of the smallest type by Sir George Denys, Bart., of Yorkshire, from 1870, in driving a long level for the purpose of cutting several veins of lead runing parallel in that district. He was our earliest customer, and showed a most unselfish enthusiasm. He repeatedly proclaimed his perfect success in the columns of the *Mining Journal*, and showed to the miners of England the results of his experience in facts and figures. Yet the main body of English mining captains and proprietors gave us little encouragement for which to thank them.

We cannot help feeling great regret at having left America, where success would have been easy, to battle against the prejudices and other difficulties which beset the spirit of enterprise in England. We have come to have little faith in the way the mining operations of public companies are generally conducted in England. Much uproar has been made of late by certain parties against Mr. Basset on account of his action concerning the Dolcoath Mine. We remember having noticed heretofore in the correspondence columns of the *Mining Journal* great laudations of Mr. Basset for other independent actions. Who knows but he may be thinking to take hold of the Dolcoath Mine, and use rock-drills and modern appliances to give an example to Cornishmen of how a mine should be worked. Some two years ago we visited the ground of a proposed tunnel in Cornwall, accompanied by an experienced contractor, who offered to make the tunnel with the help of our machines. His offer was rejected. This tunnel is now for long months back "dragging its slow length along" at the rate of 1 to 2 fms. per week, whereas it might have been driven in about a year.

Paris, March 22. MACKEAN ND CO.

OLD SHEPHERDS MINE, AND MR. GREEN'S MACHINERY.

SIR,—Although I answered all Mr. Green's questions in a previous letter, I notice he still requires to be enlightened, notwithstanding that doctors differ about ore dressing. Well, if he will kindly refer to the Proceedings of the North of England Institute of Mining Engineers, Vol. XXX., 1881, he will find full details of machinery that is capable of crushing, sizing, jigging, &c., 1600 tons of halvans per month, at a total cost of 7½d. per ton; therefore, if the ore only contained 11 lbs. of lead per ton of the value of 11d., there is a clear balance of 3½d. per ton to pay interest and depreciation on machinery, &c. I will not take up valuable space with further proofs, many of which could be given. I do not set myself up as judge advocate or dictator, consequently I pass no opinion on his machinery. The readers of the Journal can draw their own conclusions from the facts and figures supplied, or study the *Mining Journal* for themselves, as from it I draw all my information. Mr. Green must admit there are two sides to the question, and though he may make a good thing out of his machinery, this is no reason the mining public should be troubled with such lumber as that recently introduced in Cornwall, neither need Mr. Green suffer.

I believe I have fully answered all Mr. Green's questions and refuted his statements, and that my questions like my figures are unanswerable and unassailable. In conclusion, I would refer Mr. Green's careful and thoughtful considerations to the questions in my letter of Feb. 20, and my suggestions in the previous paragraph of this letter. With these remarks I beg to close my correspondence on this subject, and while sincerely thanking you for your liberality in allowing us so much of your valuable space, I hope my remarks may be the means of bringing forward some cheap, compact, and efficient dressing machinery suitable for the rough usage of lead, tin, and copper mines, our friendly discussion will not then have appeared in vain—*London, March* 21. OBSERVER.

MINING ECONOMICS.

SIR,—Thanking you for the insertion of my letter of last week I would, with your permission, illustrate my position by the example of a mine in which I happen to be a small shareholder. I simply use it as an illustration, being free to do so as a shareholder, and because its report and prospectus lie before me. It was introduced between two and three years ago with a capital, of which one-half was to go to the vendors. It is stated to have been for eight years then previously from small workings, making a profit of 1000*l.* to 1600*l.* per annum. The prospectus then states that the remaining 30,000*l.* "is a sum considered more than ample for bringing mines into a largely profitable state, which I take to mean that something like 30,000*l.* capital was requisite. The first report and balance-sheet of the company has just been presented, and it shows that of the total capital only about two-thirds had been allotted, out of which the full amount due to the vendors has been paid. Of course it is well-known that at every allotment of shares a considerable number never get beyond application, and in this case it appears 1300 shares failed at that stage, and that the disposable capital was reduced to less than one-third of the amount said to be requisite for working capital. I should, perhaps, have said allotment took place. The directors as men of great mine authority would be well able to forecast the probable necessary outlay, and the statement shows that for purchase of plant, machinery, erections, repairs, and land drainage, preliminary expenses, directors' fees, and secretary's salary, and the charges for law costs, leases, &c. (but excluding any mining), they expended nearly 9000*l.*, so that the capital really left for the mine is really less than 1000*l.* The question may be now put—What fault have I to find? Well, in the first place the statement in the prospectus indicates that a certain amount of working capital is requisite, and assuredly a subscriber would presume the scheme would not be taken in hand unless such capital were subscribed.

If such capital were necessary and was not provided it appears to me that the persons who have profited so far are solely the vendors who are paid their full sum; but the subscribed capital in lieu of standing as 40,000*l.* stands as worth about 8000*l.* in the market; it may be said market prices are no criterion, and that the mine is worth the amount paid for it, and more. What, then, has reduced its value? Flooding the market with shares, or, perhaps, I should say, and the knowledge of its want of capital. Again, it may be said, shareholders should not look at the value of shares, but hold on for results. Very well; but if the depreciation is due to the directors' action in alloting on a basis which is not a fair one, is no responsibility to attach to them? I should say the question might well be put in this wise, has, or has not, the time till present been well occupied by work at the mine; has, or has not, machinery been duly procured and erected, which would have been procured and erected, had the capital been in hand, have the standing costs, directors, secretary, captain, offices, clerks, &c., been on the two years employed as economically to the mine as they would have been if capital had been in hand? Now, I cannot, as a business man believe they have, and, therefore, I must put it as a substantial statement that herein you have "bad finance," and that the alloting under such circumstances was not good "economy," and that, putting aside questions of whether or not the purchase was too high, the shareholders' capital has not only been depreciated, but what has been done at the mine has cost too much, has not probably been carried on as rapidly as it should have been, and anything like the best available conditions impossible to be observed. I have tried to put the matter impersonally, though I certainly think that, under the circumstances, the vendors should have been dealt with differently if allotment had been made. I further think the directors' and secretorial charges high, remembering that the vendor is a director, and I will not enter upon the suggested mortgaging of the mine to the directors. It is fair to say that statement is made "that several persons agreed to take a large number of shares, but failed to do so;" but if they agreed to take they are liable, but if they did not bind themselves the word "agreed" is a misnomer. Their position was known at the allotment nevertheless. J. C.

Widnes, March 21.

MINING IN FLINTSHIRE—THE MOLD MINING DISTRICT.

SIR,—As I believe the readers of the *Mining Journal* wish to get sound information as to reliable undertakings, and as I am desirous, in the interest of this district, of seeing a mining revival here, I feel I am now justified in bringing under their notice a property which I have been watching for a long time, and which will doubtless soon come into notoriety. I do this with the more satisfaction as the Flintshire mining district for about half a century has been singularly neglected. There is no richer section of lead-bearing ground than the belt of carboniferous limestone which extends from Talargoch Mine at the extreme north to the Minera Mines to the south. The returns of ore which were made in former times are fabulous, and it is surprising that more attention has not been given to this once famous district to render it again one of the first lead-producing counties in the kingdom.

The Mold mining district is one which has suffered most severely because capital has been misapplied and inadequate machinery has been erected, and the workings have, therefore, in most cases been abandoned before the lead-bearing measures were reached. It is, however, satisfactory to find that the above company seem determined not to endanger the success of the undertaking through lack of ample power to perfect the drainage of this property, which is admitted to be one of the most valuable setts in the Principality. The work of development is being carried on unostentatiously, systematically, and economically, under the able management of Capt. Benjamin Williams, and the firm conviction of all mining men to whom I have spoken is that an abundant success will follow and reward the efforts of the management and the patience and confidence of the shareholders.

The Gwern-y-mynydd possesses a fine rake of mining ground, including the Gwern-y-mynydd, Cathole, Glan Alun, and Pilkington Mines, which have in former times returned immense quantities of silver-lead ore. A short history of the mines comprised in the undertaking will, perhaps, not be out of place here, written by the late Mr. John Darlington, sen., of the Minera Mines, than whom a more upright man or better miner never lived. In his report on these mines he says:—"The mines Cathole and Gwern-y-mynydd have probably been the richest and most productive lead mines in Flintshire, and acquired during their former working a wide-spread celebrity for the remarkable yield of lead ore which they then afforded. It is probable that their returns during some portions of the last period of working have only been equalled in a smaller time by one mine in the Principality—the Minera Mine—which they strongly resemble in most geological and natural points." A little further on in the same report he says:—"I hold a very high opinion of these mines; that opinion is grounded on the soundest geological evidence and law, aided by natural fact. All I have talked to on the subject of these mines believe in the ultimate success of the consolidated setts, with a fair amount of capital to carry out what I have advanced, and I can and do affirm that I can see no reason to doubt that we shall again see these mines to equal if not excel the past." It is, perhaps, unnecessary to say that the Minera Mine owed its success pre-eminently to Mr. Darlington, or that no inducement would have led him to express an opinion in which he did not thoroughly believe.

The mines of Gwern-y-mynydd (Limited) were formerly held by the Cornish company, who worked a large number of mines in the entire Halkyn district, and it is asserted on the highest authority that when the stoppage of all their mines took place (in consequence of the inefficient machinery made at that time for drainage, coupled with the very high rate of royalty, then one-eighth, now one-twentieth), that Cathole, notwithstanding these circumstances, was returning a profit, but was abandoned with the rest. This was further corroborated by the workings of the late company—the Mold Mines (Limited)—who raised a large quantity of ore immediately they drained the mine, and operations were suspended with the intention of erecting auxiliary pumping power on the Gwern-y-mynydd portion of the property, which they failed to do, and which this company is now effectually carring out. On this part of the property there is a splendid 85-in. Cornish pumping-engine, good winding machinery, 24-in. pitwork fixed to the bottom of the mine, and all other necessary materials, ready for draining this part of the company's property and resuming operations. Therefore, as soon as the Cathole Mine is drained and the levels put in order returns of rich lead ore will at once be made, which will about cover this mine's costs, with immediate prospects of increased returns. This may be regarded as a certainty, as some of the ends and stopes were left in good bearing ground for lead, and there is no doubt that a short extension of the levels westward will lead into the intersection of the wonderfully rich course of ore dipping eastward from the original Cathole engine-shaft. At Gwern-y-mynydd there exists an extensive rich section of lead-bearing ground, called the "flat," lying horizontally between the millstone grit and the mountain limestone, on the back of the Cathole lode. This is the only lead-bearing stratum which has been worked at Gwern-y-mynydd, and it has proved exceedingly rich. This wonderful discovery was made by some working men, who had a sub-take from the Cornish Company at double royalty. The extent of ground granted was only 160 yards long by 100 yards wide, and yet in the short space of 15 months they made a profit of 43,000*l.* The land from this point was followed and worked to a great profit for about 400 to 500 yards east, and when the workings were suspended the flat was still very rich. In fact, the ore was so strong that three sets of timber rest on one solid block of ore. The reason for the stoppage of this portion of the mine at that time was the failure of Knight's Bank, the proprietors of which were largely interested, and the necessity for sinking a shaft on the deep, and the erection of powerful pumping machinery.

The present company, who purchased the effects of the Mold Mines (Limited), took the work of development in hand some 18 months ago, and purchased also the entire plant of another property, consisting of a magnificent 85-in. cylinder Cornish pumping-engine, which has been erected on Treasure shaft, and also a pair of 15-in. horizontal high pressure winding-engines, together with all other necessary plant and machinery. This is a capital engine-shaft, 12 ft. by 9 ft., which has been carried down to a depth of 126 yards, and a 24-in. plunger has just been fixed at that depth. The sinking is being pushed forward with all possible speed, and in about 40 yards, or, perhaps, a little less, the flat will be intersected, and, a very short driving will cut the body of ore coming down from the west, when there is little doubt that large and regular returns of ore will be made. A new piece of adit level has been driven about 300 yards in length, which comes into the shaft at 62 yards from surface, and forms the outlet for the water pumped from the bottom of the mine, in addition to thoroughly draining the ground to that depth. It is proposed to continue the adit level to the Alexandra engine-shaft at Cathole, where it will come in 38 yards below the existing adit, which will greatly lessen the cost of drainage, and also to drive a bottom level in the Cathole vein, which will come under all the workings at that mine, thus laying open the riches proved to exist in that portion of the property. This adit level will pass through a virgin piece of ground, which was formerly left as a barrier between the two mines in order to keep the water distinct, and from which there cannot be a doubt that very large quantities of ore will be raised. The success of Gwern-y-mynydd (Limited) is simply a question of drainage and development. The former is amply provided for; in fact, there is a large reserve of power, and the latter is proceeding as quickly and economically as possible, and I firmly believe that in a few months large returns of lead ore will be made.

I look upon this undertaking as the pioneer of a new era in mining in Flintshire, and I heartily congratulate the company on the possession of such a fine property, and Capt. Williams on the business-like and careful manner in which he is conducting the operations with which he has been entrusted, and I can unhesitatingly state that this undertaking will bear inspection as an investment, as I believe it will grow into a permanent dividend-paying property. My hope and belief is that the success which awaits Gwern-y-mynydd (Limited) will give a great impetus to mining in this district, and that it will convince capitalists that with able management, a proper amount of capital, and strict economy—mining in Flintshire can be conducted on a sound commercial basis, and that investors may look for a good return for their money. JOHN LLOYD.

Rhyd-y-mwyn, Mold, March 20.

SHROPSHIRE LEAD MINES DISTRICT.

SIR,—We look upon it as a favourable indictation when we see the directors and other shareholders often visiting and otherwise interesting themselves in the working and general business of the mines belonging to them, and this has been the case here for the last few years in particular. Old Snailbeach is worked by a limited liability company; but do not report publicly. We wish they did, for it has been worked profitably for the last century; its reports would add to the fame of the district. We should like to see this company bring the ore from some of the other mines around, so as to keep all their smelting furnaces in full work; this would give additional labour in the neighbourhood. However, we have heard that there is a stipulation in their lease, prohibiting them from smelting any other ore than that raised in their own mine. We hear the old mines look well in the bottom; but some time is required to get the shaft down, and the deeper levels out to the runs of ore discovered. The boring machinery is an advantage in this hard mine, and good duty is being done with them in driving and stoping. The cross-cut north towards the east and west levels discovered in that direction is being driven at the rate of about 10 fathoms per month in the hard country rock. The plant upon this mine has been very much improved in the last few years, and if the price of lead goes up they will be in a pretty good position, as soon as the deepest levels are driven out to the best runs, to make large profits. The tramway from Pontesbury to this mine, by which they can run the engine to each department of the works with materials for working, and to remove the product, is a great convenience and advantage, and we hear it is likely soon to be extended to the Tankerville Great Consols and other mines on that line.

We cannot think why the London party do not commence operations in the Mytton Dingle Mine, and we hope they will not allow it to slip out of their fingers. We have heard that a new prospectus with a sketch of the mines in the neighbourhood is to be issued shortly by a new company for Perkin's Beach. We wish them every success. That they have a fine range of mineral ground, with large and productive lodes in it, is well-known to all who are acquainted with the mineral districts here. We should very much like to see Watson's shaft deepened at the old Tankerville Mine to the junction of the lodes in depth. Pennerley is a good mine, Potter's Pit will soon be drained of water if the dry weather continues, and to the rich ore-course there available for working. We think it quite possible that a good run of ore may be found west of the old workings in the bottom levels at the Bog Mine, and if there is not a very great future in the way of profits for the shareholders in the Tankerville Consols we shall be very much disappointed. The great pull for machinery opening the mines is clearly at an end in these united mines, and they ought, and no doubt will be worked moderately cheap in the future. The very severe weather, in the shape of frost and snow, here is much against surface operations, it being very severe indeed for the time of year. MINER.

MAGPIE MINE, DERBYSHIRE.

SIR,—It was with much interest and pleasure I first read in the Journal of the remarkable discovery of blende (zinc ore) at this mine. The same, I am doubly pleased to state, has since been confirmed. Magpie Mine is associated in my mind with my schooldays, spent at the town of Bakewell, only a few miles distant from the mine. The mine adjoins the old village of Sheldon, where most of the miners reside. When a lad I often chatted with the old miners, who, in their quaint dialect, always spoke in the strongest terms of the richness of Magpie, which in Derbyshire is proverbial. To many readers of the Journal the history of this wonderful old mine, from its commencement, or as far back as the records in the Barmasters' (agents of the Duchy of Lancaster) books can be found, would be interesting, and perhaps Alderman Fairburn may be induced, upon some future date, to supply this information.

There may be other gentlemen deserving of congratulation with regard to the position in which the mine now stands; but to Alderman Fairburn alone is the credit due for its present success. He has borne the brunt of the fight, and has been the pioneer, through good and evil, who has gallantly struggled, and eventually overcome, the difficulties under which Magpie formerly laboured, in respect to the water, by the erection of suitable machinery and driving a long, deep adit. The latter has taken nine years to accomplish, at a cost of 14,000*l.* He has been the principal one upon whom has fallen the task of piloting the ship into harbour; and when I say it is the fervent wish of all who have the honour of Alderman Fairburn's acquaintance that it may prove a rich Argosy, I feel sure that I reiterate their sentiments.

To those who are acquainted with Alderman Fairburn's mining career no one is more worthy of a substantial reward, if speculation, perseverance, and indomitable pluck (tools a miner cannot work without) are deserving of one. It may not be out of place here to mention that in Alderman Fairburn's own town, that of Sheffield, no gentleman is more highly esteemed or held in higher regard by his townspeople. To one who knows anything at all about the Magpie property the important and valuable discovery referred to has greatly enhanced its value, and with the future prospects of the productive old Magpie lead lode, it must now appear almost a certainty that the mine will be even far more profitable in the future than in the past, thereby realising the hopes always entertained of its ultimate prosperity.

Knowing the mineral districts of Derbyshire well, particularly that of the King's Field, and being acquainted with many of the lodes, some of which can be traced at surface for seven and eight miles, I am quite at a loss to understand why capitalists do not devote a little of their attention and money in restoring the prestige of Derbyshire as a lead mining county, for it is a well-known fact that most of the mines have only been worked as far as possible by horse-power or to water level, by parties of miners (working men), who having no capital to erect necessary machinery to further work the mines have had unwillingly to abandon them, when in nine cases out of ten a few thousand pounds would restore them to a profitable position even with the present state of the lead market, which cannot last long, as the price of lead is at last showing a steady

upward tendency. The old mineral customs of Derbyshire are unique, have for centuries been in vogue, and have been confirmed by Acts of Parliament, are all that a mining speculator can wish for, no expense entailed by leases, and last, but not least, no dread of fines for the renewal of one or the refusal of granting one. The land is held in perpetuity, or as long as the customs are conformed to, which is an easy and inexpensive process.

Alderman Fairburn, Mr. Wass, and Mr. Horatio Bradwell are the only marks left to remind one that there are still rich prizes to be won in Derbyshire, mines which hitherto have produced such enormous wealth, and which I predict will yet make Derbyshire the lead mining county of England. WM. NINESS.

Perranporth, March 19.

DOLCOATH AND SOUTH CARADON.

SIR,—The unfortunate and startling course adopted and pursued in connection with the renewal of the leases of these two great mines has caused absolute wonder and amazement throughout the two western counties. Such has been the effect produced by this unparalleled exercise of arbitrary power that public feeling is aroused, and there will, in all probability, be an immediate public manifestation of that feeling.

In the excitement of the moment thoughts are expressed which, if acted upon, might prove detrimental to all parties interested, it is, therefore, to be hoped that just and moderate views may prevail; and that whatever modification may be considered desirable in the interest of British mining, in its hard struggle with foreign competition, foreign stringent protection, and British one-sided free-trade, such modifications may be sought for in a temperate and equitable spirit. Strongly as the conduct of the owners of the land of Dolcoath and South Caradon and their obstinate advisers may be condemned, it must, in fairness to landed proprietors generally, be remembered that during the long and deep depression some few years ago they rendered generous help to shareholders by a liberal reduction of dues, and during that serious emergency the Duchy of Cornwall and other landowners stood nobly forward in a time of need as real and true friends to mining and mining enterprise. TAVISTOCK.

THAT THE PRESENT SYSTEM OF LEASING MINES IN CORNWALL, THROUGH THE IMPOSITION OF UNREASONABLE TERMS, OPERATES AGAINST MINING INDUSTRY.*

You all know that mining in this county is one of its staple industries, if not the chief of them. Agriculture is another, and the fisheries another. For a long series of years the toast of "Fish, tin, and copper" was adopted at most gatherings of business men where the glass went round. Agriculture was not included in that toast, because that pursuit is not speculative like the others. The metallic minerals are hidden treasures, and those who seek for them are called "adventurers" or "speculators." As in lotteries some of the ticket-holders get large prizes, so in mining very large profits are made by some of the shareholders; and that circumstance stimulates other people—even men who can badly or not at all afford it—to take shares in view of dividends, and many persons having ventured too largely have thereby been brought down to poverty. No man should risk more than he can afford to lose, and he should not bring burthens on other people by his failure.

I am not going into the history of mining; but it is well known that tin was a commodity dealt in by Cornish miners at a very early date, and sold at Marketjew to the foreigners (Phœnicians and others), who came there to buy it. It is said that Marketjew (now Marazion) was so named because Jews came there to purchase the tin. This was at least 2000 years ago, and long before copper or lead was known by their tinners. Tin streaming and tin mining have been carried on in Cornwall for many centuries, but mining never so extensively as within the last few years. The practice of streaming for tin is almost a thing of the past, the stanniferous detritus of our valleys having been worked over several times, and thus rendered non-paying. Valuable lodes have been discovered by streamers. I knew the streamer who in or about the year 1800 cut the main lode in Godolphin Mine, from which mine the Messrs. Williams, of Scorrier, derived 90,000*l.* profit in a few (about nine) years. Before the landowners knew the importance—even to themselves—of mining for tin they offered in many cases opposition to the miners by declining to grant to them the liberty of searching for it, thereby preventing the development of Nature's treasures—the commonwealth. In consequence of that opposition the Legislature interfered, and empowered the Vice-Warden of the Stannaries to grant to the miners liberty to search for tin within certain limits to be marked out for them. The space so marked out was called a "tin bound"—four or more corners being marked by hillocks of earth close by a little pit, with was the actual corner. The tinners had to pay 1-15th of the value of tin raised as dues. If the tinners abandoned the working for 12 months their liberty elapsed by law. I believe that all the tin bounds are now extinct. Now that nearly every landowner is disposed to grant leases on his own terms the necessity of tin bounds has almost ceased; but, should the necessity arise, an appeal may still, I believe, be made to the Vice-Warden for power to work. Very few landowners are disposed to take the responsibility of mining, because they know the risky nature of such an undertaking; they should, therefore, give every reasonable encouragement to those who are willing to take that responsibility. But landowners, as a rule, impose terms, covenants, and conditions which are very absurd and hard to bear, and they allow their legal agents to charge too heavily for the instrument which confers the power to work—the charge for a lease ranging from 25 to 40 guineas.

In most cases the applicant for leave to work asks the lord's mineral agent for a licence or "tack-note," which in some cases extends to six and in others to 12 months. For that document he pays a charge varying from 2 to 5 guineas. Sometimes it is renewed for a similar term at a like charge. Before or at the expiration of such term of six or 12 months the licensee applies for a lease of 21 years. And here a difficulty arises. The solicitor or the landowner requires the names, additions, and residences of two or three gentlemen of substance who will consent to become lessees, and so take the responsibility of all the conditions and covenants to be contained in the proposed lease. The licensee being usually a man of small means is not admitted as one of the lessees, and he may find it difficult to obtain such persons as the solicitor or his client demands. I will mention a recent case. Mr. Beauchamp, of Trevince, whose solicitor is Mr. F. Hearle Cock, Truro, granted a six months' licence to a gentleman in Truro. That gentleman sold his interest for 200*l.* and some free shares to a promoter of mines. The purchaser thereupon spent from 200*l.* to 300*l.* in plans, advertising, &c., and had, in consequence, a large number of shares subscribed for. When he went to the vendor, or Mr. Cock, for the lease which he had promised to supply he found that before he could have the lease he had to submit to the following conditions:—He must pay 100*l.* for five years' rent in advance, to be merged in dues; 100*l.* for a field that may be wasted, and 75*l.* for the lease (deed) and attendances in the matter: total 275*l.* He named several lessees, who were rejected. If he had not incurred the expenses referred to and got a company partially formed he would have given up the company in disgust; but, being so bound, he made a sacrifice to get two gentlemen to become lessees. He paid them in cash 100*l.*, and assigned to them 350 2*l.* shares fully paid up: total 800*l.*, which added to the 275*l.* above mentioned makes 1035*l.* outlay before the works commenced. The shares were a part of those he charged for the mine, for he had no money consideration from the company. You will perhaps wonder, as I do, at the absurdity of requiring substantial lessees when five years' rent was prepaid, and 100*l.* for land which may never be wanted. Such an unreasonable owner does not deserve to have a good mine on his estate. Many mines do not continue at work five years; if in this case workings should be suspended before the end of that period would the lessor, think you, refund any portion of the 100*l.* paid in advance for rent, if not merged in dues? To insist on the payment of 100*l.* for land before it is used, and which may never be required except in part, is a great absurdity; and when the lessees (the company) quit the premises by abandoning the works they will not have an inch of land there to call their own. The lord takes possession of the field again as his own, without repaying a penny of the 100*l.* A former company also paid for the same field or a part thereof, and every succeeding company (if any) will, I suppose, have to do the same *ad infinitum*.

In every mining lease which I have seen there is a covenant on the lessees' part to yield up at the end, or sooner determination of the term, all the buildings erected on the premises whatever they may be—account-house, smithy, carpentry, store-house, engine-houses or dwelling-houses, without receiving a penny from the lord on account of building them. In some mines the cost of such buildings is thousands of pounds, as at Clifford Amalgamated, Dolcoath, Tincroft, Carn Brea, East Pool, and Devon Great Consols. I have been informed that the Duke of Bedford made the lessees of the last-named mine covenant to yield up to him the railway constructed by that company on the expiration of the lease of Devon Great Consols. It is a railway from these mines to Morwellham, and it cost probably 25,000*l.* I do not know a more unreasonable lord than the Duke of Bedford. He has charged from the first 1-15th dues, which is higher than the dues in most mines in Cornwall. He has received in dues about half-a-million sterling, and when the company wanted additional land to follow the lode eastward he charged 20,000*l.* for the grant of it for 21 years. From this land they have not raised any mineral of value; and when his Grace was applied to for reduction of dues when the company were losing money by the prosecution of the works in Devon Great Consols he declined to accede to their request. Mr. Basset, of Tehidy, has shown more liberality, he having on many occasions either remitted the dues during pleasure, wholly or in part, and Lord Robartes has done likewise. But the demand recently made by Mr. Basset of 40,000*l.* from Dolcoath adventurers for a new lease, 4½ years before the expiration of the current lease is without precedent in this county, and has detracted largely from his reputation as a liberal lord. He has subsequently upon remonstrance modified his terms by consenting to grant a new lease for 21 years to take effect upon the expiration of the existing one (August, 1887), at 1-12th dues, instead of 1-15th now paid, but the increased dues to commence immediately.

The mining leases require the payment of the royalty or "dues" out of all the moneys received for ores sold, which they now call a rent to avoid the parochial rates, which the lord formerly paid on their dues. You see herefrom how studiously the lessors of mines mind "No. 1"—*i.e.*, themselves—and throw all the burthens on lessees. They can afford to be liberal, but selfishness is very apparent in their mode of leasing mines and sites for dwelling-houses. To illustrate the value of metallic mining to the owners of mineral properties I may state that from the mines in Camborne and Illogan, where Mr. Basset is the lord, he and his predecessors have received for dues about 20,000*l.* per annum for the last 40 years. Dolcoath alone pays nearly 9000*l.* a year for dues to that gentleman. But I can say that Mr. Basset is more liberal to miners than some lords, or he has been so.

We hear a great deal about reforms, political reforms, moral reforms, &c. It is time that an agitation should be commenced to bring about a reform in the leasing conditions now insisted on by landowners, which are intolerable and too heavy to be endured. I think that I am a reasonable man, and would not ask from any landowner a lease on terms which are contrary to reason. The following are some of the reforms which should be made in mining leases:—1. The minimum rent should be less that that usually charged, and should not be required in advance beyond one year. This rent is put on to compel lessees either to work or give up the sett. There is some reason, therefore, in charging a small rent.—2. Dues should be charged on profits only—none ought to be otherwise charged. It is unreasonable to lay any burthen of the kind on the adventurers while they have to advance money to meet the expenditure of carrying on the works.—3. Land wasted by mining should be paid for at its commercial value, and not, as at present, at three or four times its value, and the lessees having paid for it should have a term in it like that granted to conventionary tenants of the same lord. It is an anomaly to pay for an article or thing and not possess it, except for the short time in which most mines are worked. Very few mines comparatively are worked for 21 years. A large portion of the land paid for by mining lessees is not absolutely destroyed, but is recoverable at a small cost. No payment should be made for anticipated waste, as was done in the case cited, where 100*l.* was paid before works commenced.—4. The erections—houses of all kinds—should be granted to the mining lessees for the same tenure as that of the lord's other tenants who took building leases; that when the company cease to work, from whatever cause, they might sell the houses, so as to realise at least a portion of their outlay thereon. If the lords choose to buy them they should have the opportunity, but they should not require the buildings to be delivered up to them without a money consideration.—5. The covenants contained in mining leases should be more consonant with common sense than those now usually adopted. A covenant to the effect that "all the works in the mine should be conducted according to the practice of intelligent mining" would, or should, supersede a good many of the covenants now in use, many of which are nugatory. If any question should arise as to the mode of working an intelligent manager should be called to decide the question, and his decision should be binding. If the lords were to exercise their power of re-entry under the present covenants a great many companies would be ejected from their mines. It is the interest as well as duty of a manager to do his best to make the working profitable to his employers, and the lord's interest therein is concurrently promoted. Profit is the object, and that is always kept in view by the managers; and as people say that "a good bal makes a good cap'n," the manager would, of course, like to have a good bal, as he would thereby be elevated in the estimation of the shareholders and the public, and would be employed to report on mines, &c., being considered superior in judgment and talent to the man who has the misfortune to manage poor mines.

I contend that in cases where the working of a mine involves a loss to the workers the lord should have no profit, nor should he lose thereby, unless he is included in the company. Closely allied to mining is the china-clay industry, which at present affords employment in the parishes of Roche, St. Stephens, St. Blazey, Luxulyan, St. Mewan, St. Enoder, Breage, and other places to thousands of persons. The working for china-clay is not hazardous like metallic mining; and, therefore, the dues charged are much higher, varying from 1s. 6d per ton, charged by Sir Colman Rashleigh, to 3s. or 4s. per ton charged by other lords. The price of china-clay varies from 16s. to 32s. per ton according to the quality. The minimum rent, so called, on clay-works is very heavy. The West of England Company pay 7000*l.* per annum to Capt. Fortescue; but, in general, the rent is about 300*l.* or 400*l.* for each work, all merged in dues. These rents are serious incumbrances before returns are made, and should not be charged till then.

"The lord is not compelled to grant," said a mineral agent to me a few weeks ago. That is true; but it is his interest and duty to do so, and he ought to do it on reasonable conditions. "Let reason rule" is a maxim which ought to be observed in granting setts, and in every other act. It is not within the scope of my subject to speak of other leases than those of mines; but I can hardly refrain from referring to the leases of land and building sites. First, as to land inclosure. Up to this time, from time immemorial, the landowners have rarely granted a longer term than 99 years, and that determinable on the decease of three lives, which tenure may be estimated, on the average, at 45 years. The tenant reclaimed the land from waste, and made it a valuable farm, paying all the while a rent of from 5s. to 20s. per acre. On the expiration of the term all the imparted value becomes the lord's. I know some tenants near Truro who improved crofts, making them arable lands, paying 20s. per acre for a term of 21 years only; but in this case the soil is exceptionally good. Second, as to building sites, the same rule has been observed—terms for 99 years, determined as aforesaid. Some landowners—Lord Robartes and Mr. Enys, for instance—have lately become more liberal and encouraging by granting terms of 99 years certain. I contend that a man who builds a house should have it for ever on paying a fair ground rent. It is time that the present selfish system of leasing mines, commons, and building sites should be altered. We want an English land law. I conclude, Mr. President and gentlemen, by affirming "that the present system of leasing mines in Cornwall, through the imposition of unreasonable terms, operates against mining industry.

P.S.—The proposition was carried unanimously.

* This paper was read before the Truro Debating Society by Mr. R. SIMONS, C.E., of Truro.

REPORT ON THE MINING CONCESSION OF BAIGORRY (OR BANCA), SITUATED IN THE BASSES PYRENEES, IN THE NEIGHBOURHOOD OF ST. JEAN PIED DE PORT, CHIEF TOWN OF FRENCH NAVARRE.

The portion of the Pyrenees which has at all times proved most favourable for mining operations is that comprised in the districts of Navarre and Guipuzcoa, forming the western extremity of the chain. The low elevation of the mountains, the constancy of the streams, the abundance of forests, and the character of the rocks render this easily accessible region a typical mining district. Here alone in the Pyrenees have mines been worked successfully to considerable depths, while the number, extent, and character of the ancient workings above the drainage level afford evidence that the deposits are of a seriously important description. The mine of San Narciso has been recently worked with increasing success to a depth of about 200 metres by the Compagnie Asturienne; that of Changoa has yielded abundance of splendid ore to a depth of above 80 metres; and that of Banca was worked in the last century to a depth of 160 metres with the results to be stated below. From accidental causes the geology of the region has, however, been neglected and misunderstood until mapped by the present writer. The Spanish Government Geological Survey, in lately reproducing the Spanish portion of the map in question, enumerate the previous publications on the subject, and conclude as follows:—"Mr. Stuart-Menteath dealt consequently with an almost entirely virgin country when he preceded us by a short time in the geological survey of the northern zone, the most important, and with the date April 4, 1881, appeared in the 'Bulletin de la Société Géologique de France,' his memoir—'Sur la Géologie des Pyrénées de la Navarre, du Guipuzcoa, et du Labourd,' of the highest importance for the country of which we treat."* The geology of the French side has been almost equally neglected, and the official map is still in preparation by M. Genreau, Ingénieur en Chef des Mines, late Government mining engineer of the Basses Pyrénées (who is also engaged upon an elaborate report on the mines of the Baigorry concession, which he regards as of the very highest commercial value). Through the influence of M. de Freycinet, himself a mining engineer, who has personally studied the geology and mineral resources of the district, a railway has been undertaken by the French Government expressly with a view to developing the mineral wealth of the Baigorry concession, by connecting it with the port of Bayonne, where extensive iron foundries have been recently established, while the port is being rapidly improved. This railway is in active construction, and the most difficult portions have already been executed. The intermediate portions not yet executed have been fully marked out, and I am assured by the authorities of the Basses Pyrenees, as well as by the chief engineer in charge of the lines constructing, that this line will be definitively opened to traffic within four years. From the point thus connected with Bayonne the line has been surveyed for the purpose of extending it to Pampeluna, a project which must almost inevitably be carried out, while it is in any case certain that it will be extended to St. Jean Pied de Port and the village of Baigorry. But St. Martin d'Arossa, the point to which the line will be first opened, is perfectly adapted for all purposes relating to the iron mines, and is connected by 10 miles of nearly level carriage road with the mouth of the Banca Copper Mine. The completion of the various branches of the railway would, however, place every part of the Baigorry concession within immediate access of the railway, about 20 miles of which would run within the said concession—a fact of great importance to the ulterior development of this extensive metalliferous basin.

The concession of Baigorry, comprising 116 square kilometres, is the largest in France, and is held in perpetuity from the French Government at the trifling tax of 10 francs per square kilometre, and a small percentage on net profits. Its southern portion is rich in highly argentiferous copper ore; the rocks, according to the graphic but scarcely exaggerated expression of an American engineer, being "rotten with grey copper." The northern portion abounds in iron ore, which in quality and abundance can defy competition. The newly established ironworks of Bayonne afford a local market for the entire produce of the iron mines; and works have been lately established at Bayonne under American auspices for the treatment of grey copper ore by a new process.

The most important of the argentiferous copper mines is that of Banca, which has been treated by all authorities who have described it, as the most important mine in the Pyrénées. According to reliable documents the mean annual production during the last years of regular working, before 1776, amounted to 175 tons of metallic copper, obtained from the smelting of 875 tons of ore, although the appliances and methods of working were primitive, costly, and inefficient. Under these circumstances a new manager transferred the pumps from the deep workings to another vein then untried in depth, and which, worked in a most inefficient manner, yielded inferior results. Baron Dietrich, in his very complete description of the mines of the Pyrenees, executed for the French Government in 1786, supplies a mass of valuable information on the mine, accompanied by working plans, and expresses his conviction that this abandonment of the deep workings was an error due to an erroneous impression of the superior value of the vein preferred by the manager. The immediately succeeding events of the French Revolution ruined the company, and led to the abandonment of the mines, in common with nearly all others in France. The celebrated Charpentier, in his "Constitution Geognostique des Pyrénées," particularly describes the Banca veins, and although strongly and most unjustly prejudiced against Pyrenean mines in general, he accepted the management of an attempt to reopen this mine, which was not carried out, owing, as he says, to "des evenements imprévus et malheureux,"—referring to the Spanish Revolution of 1820 and the consequent war with France. M. de St. Brice, Ingénieur en Chef des Mines, prepared in 1853 an elaborate report on the Baigorry concession, which he considered to form "one of the richest metalliferous basins," and he especially describes in the most favourable terms the copper veins of Banca. Finally, M. A. Caillaux, in his admirable "Description des Mines Métalliques de la France," describes the veins of Banca as of peculiar importance.

The recent completion of an excellent carriage road, passing th mouths of the Banca galleries, and the present construction of the railway, completely alters the former conditions of transport, while the employment of modern methods and appliances would incomparably facilitate the working of the mine.

Having repeatedly visited the Banca Mine during the last dozen years, and having carefully examined all the accessible workings, I shall briefly summarise the results of my observations. The mine includes several true veins of from half a metre to more than a metre in thickness, besides many subordinate branches. These have been worked superficially over a horizontal extent of many hundred metres. The directions being extremely various, intersections are frequent; but the individual veins are of very regular character. Judging from the nature of the work executed, and from the quality of the poor portions left standing, the contents removed were a rich mixture of copper pyrites of high quality with highly argentiferous grey copper ore, mingled with veinstone consisting of quartz, brown spar, and fragments of the enclosing argillaceous schist and quartzite; a little spathic iron, iron pyrites, calcite, and steatite, occurring as subordinate minerals. Only one vein has been worked to a depth of 160 metres below the stream that passes the mouths of the galleries, and some of the other veins have been worked to a few metres below the same level. But since the French Revolution the lower workings have remained drowned, and no new workings in depth have been attempted. Only within the last dozen years some 15 to 20 men have been occupied in driving an exploratory gallery, and in stoping a small portion of the upper part of one vein which had been neglected by the former adventurers. The results of this

* Reconocimiento geologico de la provincia de Navarra: Boletin de la Comision del Mapa Geologico de España. Madrid: 1882.

trifling work have been extremely encouraging. The skilled engineer who has been in charge of the mine during the last dozen years deduced from these results, in 1874, a most careful and moderate estimate of the returns to be expected from a serious reopening of the workings. This estimate amounts to an annual net profit of above 12,000*l.* Since that date fine masses of rich ore have been encountered. From my own observations in the mine and on the dressing-floor in different years, and from the information of other engineers acquainted with the mine, I am able to confirm the above-mentioned estimate as representing a minimum, and as much below what may be reasonably expected from the important veins that would be rendered available by the expenditure of moderate capital. At least 1000*l.* must, moreover, be added for the reduction in cost of transport which will be effected by the opening of the railway. In the above-mentioned estimate the value of the ore is calculated from the assay of a parcel of about 100 tons. A sample of the grey copper ore selected by me from various parts of the workings gave 163 ozs. of silver to the ton of ore, with 23 per cent. of copper, on assay by Messrs. Johnson and Matthey; and a sample selected some years since by M. Genreau, gave on assay at the Bureau des Essais of the Paris École des Mines 334 ozs. of silver to the ton of ore, with 31 per cent. of copper. This rich ore appears to be nearly always present in serious proportions, and it occurs at intervals in pure masses. It is scarcely possible to give any reliable estimate of its relative amount, but so far as I have had means of judging I should usually expect about one of grey copper to seven of copper pyrites. But the proportion of grey copper appears to be much greater in the large masses of very clean ore that seem not infrequent in the mine. On the whole, while comparatively little profit can be expected from the mere gleaning of the superficial portions of veins that have been periodically ransacked since Roman times above the drainage level, the most brilliant results may be expected from a resumption of work in depth, such as is known to have yielded large profits in the last century. Below the drainage level the veins are not only ascertained to be of richer quality, but they are there for the most part intact. And according to the notes left by the manager who transferred the pumps from the deep workings, the vein in the bottom, at 160 metres below the stream, was still in full thickness and holding "stamps ore of silver and copper."

Many other copper veins, some of which have been partially attacked, and several of which are of considerable promise, exist in the neighbourhood of the Banca group. None of the minerals of the concession have to my knowledge been assayed for gold, but a valuable proportion of gold has been found in the ore of copper mines worked under my direction in the same rocks at a short distance across the Spanish frontier.

The chief iron mines of the Baigorry concession are those of Ustelleguy and St. Martin d'Arossa, both conveniently situated in regard to the railway in construction. That of Ustelleguy is unquestionably the finest spathic iron mine in the Pyrénées, and greatly surpasses in facility of working and quality of mineral all the remarkable iron veins that characterise the western portion of the chain.* It is a true lode, presenting where formerly worked a width of nearly pure spathic iron ore of from four to fourteen metres, the lode dipping about 65° from the horizontal. This portion is exposed by an immense gallery along a length of about 100 metres, which is further continued by a gallery of about three metres in width, driven in solid ore for an additional length of about 150 metres. An adit situated at 32 metres vertical depth below the last-mentioned excavations strikes the vein at about 190 metres from its orifice, and has been driven about four metres into the massive ore, so as to enable a rise to be commenced to meet a winze begun from the upper gallery; but these workings, executed about 30 years ago, were suddenly stopped owing to the abandonment of the neighbouring local foundries. Above the adit the vein may be traced by a series of superficial workings to the summit of the mountain, and thence to the cuttings of the railway in the valley of the Nive. Assuming that over this extent the vein has a mean thickness of only two metres, the amount of ore obtainable above the adit level would be more than 3,000,000 tons. But old workings have existed at a lower level, and could be resumed, which on the same assumption would yield about 6,000,000 tons above the drainage level. Judging from the nature of the other veins in this portion of the Pyrénées, and from the nature of the rocks and fissures that accompany the vein of Ustelleguy, I believe that this estimate is most probable, and that at the worst 3,000,000 tons of good ore may be safely counted on from this vein. A considerable amount of excellent brown hematite would be obtainable from the upper workings. Properly developed the mine may be expected to yield at least 50,000 tons of ore yearly, which at a minimum selling price of 16 francs per ton at Bayonne, may be expected to yield a net profit of at least 6 francs per ton, or 12,000*l.* per annum.

The spathic iron mine of St. Martin d'Arossa, the next in importance to that of Ustelleguy, is accessible by a short adit, opening within 300 yards of a proposed station on the railway, and leading to irregular workings extending about 100 metres along the deposit. Having rapidly planned these workings, and carefully examined the surface, I believe that the deposit may be classed as a contact vein, inclined about 45°, and the most remarkable of its class in the district. The workings being in a dangerous condition have been little studied; but in this mine, as in that of Ustelleguy, they may be regarded as insignificant in comparison with the importance of the deposit. The outcrop at St. Martin may be traced by the assistance of superficial workings for about 300 metres of horizontal extent. Loose stone may be conveniently obtained for packing, and a conveniently situated stream would supply power for pumping if required. In any case the working of the deposit above the drainage level might be expected to yield, considering the advantages for transport, a net profit of at least 2000*l.* per annum. The ore is precisely similar to that of Ustelleguy. The deposit is of variable thickness, exhibiting in one part of the old workings a width of 13 metres of nearly pure ore.

These iron mines having supplied with great facility more than sufficient ore for the former local demands, the numerous other indications and outcrops of iron veins within the concession have been comparatively neglected, but there can be no question that a very trifling amount of labour expended in research would lay bare additional sources of available supply. The reputation formerly acquired by the iron produced from these ores is the best proof of their quality. Assays executed by Messrs. Johnson and Matthey on samples selected by me gave 45·5 and 45·4 per cent. of metallic iron for the ores of St. Martin and Ustelleguy respectively. The ore is specially suited to the production of superior steel.

Wood for calcination kilns can be obtained at moderate cost, and it would be certainly advisable to calcine before transport the greater part of the iron ore extracted. An additional net annual profit of about 2000*l.* may be fairly expected from the saving in transport and superior price obtainable by this means.

It would be impossible to discuss within moderate compass the means advisable for satisfactory working of the vast and complex property under consideration. Much will depend on the preliminary researches necessary for guidance; but at the worst the expense necessary to put the copper mine of Banca in full work, including construction of the necessary dressing apparatus, need not exceed 16,000*l.*, while for inclined planes and other appliances, including galleries for purposes of development, 8000*l.* should amply suffice for the two chief iron mines. The maximum preliminary expenditure may be thus estimated at 24,000*l.* The yearly net profits after the opening of the railway may be expected to attain at least 29,000*l.*

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St. Jean de Luz, March 7.

** The TITLE-PAGE and INDEX to VOLUME LII., for the year 1883 was published in the *Mining Journal* of Jan 20.

* This mine is described as follows by M. Genreau: "Superbe filon de fer spathique pur, sans pyrites. Tres regulier dans son allure. Puissance variable de 1 a 6 metres. N'a été que faiblement attaqué dans sa partie supérieure. Minerai excellent pour la fabrication du fer."

FOREIGN MINING AND METALLURGY.

Colder weather which has prevailed during the last few days has occasioned a revival in the consumption of household coal in Belgium, and the rates recently current have been supported with considerable firmness. In other respects there is scarcely any change to report in the general condition of the Belgian coal markets, industrial coal having continued in good demand. Household coal has been selling at 10s. 6d. to 12s. per ton in the Liége basin, and in certain districts of the Hainaut. Contracts are about to be let for 312,000 tons of coal required for the use of the Belgian State Railways. The tone of the German coal trade has still been rather weak, transactions having been carried through with difficulty in consequence of an excess of production. Prices have at the same time been fairly well supported. The exports of coal from Germany have presented about their usual importance, and the home consumption, although not sufficient to absorb the current production, has displayed a certain tendency to increase. The deliveries of coal from the Saarbruck district in February amounted to 469,275 tons, against 425,730 tons in February, 1882, showing an increase of 42,545 tons, or about 10 per cent, in the second month of this year. The deliveries have increased as well by railway as by canal. Large deliveries of coal have been made of late over the railways accommodating the basin of the Ruhr, the daily average having been about 78,500 tons, against 74,500 tons in the corresponding week of last year.

It can scarcely be said that the recent improvement in the Belgian iron trade has become more decided during the last few days. Work has not absolutely made default, and current orders have continued to come to hand, but in small numbers. Enquiries have been more numerous and of more importance, it is true, but the number of transactions actually concluded has not increased. The rolling-mills are far from being sufficiently occupied to admit of any improvement in prices, and their condition remains in consequence somewhat unsatisfactory. The mechanical construction workshops are pretty well provided with orders, but as much cannot be said of other works. Pig has continued to be supported with considerable firmness. English pig has been firm at 2*l.* 8s. per ton; while Belgian casting pig has brought 2*l.* 18s. per ton at Charleroi and 2*l.* 10s. per ton in the Belgian Luxembourg. Refining pig has remained at 2*l.* 10s per ton, with the customary difference of 4s. and 8s. per ton for ordinary pig and mixed pig. As regards iron, No. 1 cannot well fall below 5*l.* 4s. per ton, while it is not likely, under present circumstances, to rise much above that rate. No. 2 maintains, more or less distinctly, the difference of 8s. per ton, and it is the same with No. 3, which has brought 6*l.* per ton. Girders have not been in more active request at 5*l.* 12s. per ton. No. 2 plates have been supported at 7*l.* 4s. per ton, but have not shown any very great firmness. No. 3 plates have made 8*l.* per ton, and plates of commerce 8*l.* 16s. to 9*l.* 12s. per ton. The mineral production effected in the Grand Duchy of Luxembourg in 1882 amounted to 2,539,295 tons, as compared with 2,161,881 tons in 1881, and 2,173,463 tons in 1880. The value of this production was 293,461*l.* last year, as compared with 248,219*l.* in 1881, and 263,542*l.* in 1880.

The situation appears to have become rather aggravated in France. In the Nord several works have been obliged to dismiss a portion of their workpeople, and building operations appear to have been suspended, to a large extent, at Paris. A fall of 4s. per ton has taken place in consequence in the price of merchants' iron at Paris. Plates have also receded to 9*l.* 8s. to 9*l.* 12s. per ton. Still further reductions have been made even in some cases from these reduced rates, rebates of from 2s. to 4s. per ton having been consented to by merchants anxious to clear out their warehouses. The imports of iron minerals into France in January amounted to 118,104 tons, as compared with 89,285 tons in January, 1882, and 68,920 tons in January, 1881. Of the iron minerals imported into France in January, 20,808 tons came from Belgium, 35,903 tons from Germany, 23,632 tons from Spain, 4847 tons from Italy, and 29,026 tons from Algeria. The exports of iron minerals from France in January this year amounted to 2527 tons, as compared with 3937 tons in January, 1882, and 2347 tons in January, 1881. The Bulletin of the Committee of French Forgemasters gives in detail the principal orders for railway *materiel* given out in France by the various railway companies in October and November last year. Among the *materiel* so ordered may be mentioned 12,400 tons of steel rails ordered from the Steelworks Company of France by the Orleans Railway Company at 7*l.* 15s. per ton, and 3600 tons ordered from the St. Nazaire Steelworks Company at 8*l.* 14s. 2d. per ton.

The Eastern of France Railway Company has given an order to the John Cockerill Company for 6000 tons of steel rails, at 8*l.* per ton. The same company has ordered 6000 tyres of fine-grained iron from the Ougree Works at 13*l.* 12s. per ton. An improvement continues to be remarked in the tone of the German iron trade. Transactions have become much more numerous, and prices have hardened in consequence. Casting pig has been placed with greater facility, while several contracts have been concluded in rolled iron. Iron for construction purposes has also been in some request. Puddled pig has, however, been rather more offered than enquired for. The German steelworks have continued well employed. An adjudication for tyres took place recently at Strasburg. Krupp carried off 600 locomotive tyres at 13*l.* 16s. 2d. per ton, and 500 tyres for tenders at 13*l.* 7s. 8d. per ton. Quotations in the German irontrade have not experienced any material change. The production of pig—puddled, spiegel, Bessemer, Thomas, and casting—in the Zollverein in January this year is semi-officially estimated at 278,995 tons. The corresponding production in December, 1882, was 283,758 tons. Notwithstanding the diminished output in January this year, the number of furnaces in blast in that month in the Zollverein was 155, as compared with 146 in December, 1882. The production of pig in the Zollverein in 1882 is returned at 3,170,957 tons, as compared with 2,914,009 tons in 1881, 2,729,038 tons in 1880, and 2,226,587 tons in 1879. The consumption of pig in the Zollverein in the four years is returned as follows:—1882, 3,215,711 tons; 1881, 2,851,685 tons; 1880, 2,679,425 tons; and 1879, 2,181,844 tons.

DEVELOPMENT OF IRISH INDUSTRIES.

The consideration of the temper and feelings of all dissatisfied leaves little doubt that the want of remunerative employment is in the majority of cases the primary cause of discontent, although it must be acknowledged that when discontent has once taken root the smallest possible matters, even if totally unconnected with the question of employment, will suffice to propogate and develope it. For the past century the people, that is to say those who ought to form the working classes, of Ireland have been in a mental condition which quite unfits them either to govern or support themselves, and this is more especially so in the Catholic portions of the country, which is to a large extent under the control of a comparatively illiterate priesthood. Yet by nature the Irishman is industrious, energetic, polite, intelligent, and good humoured; in fact, combines all the qualities necessary to make a good and prosperous workman and a pleasant companion. This, indeed, is evident from the prominent positions which Irishmen speedily attain in foreign countries, where they are freed from the influences which so lamentably impede their progress at home. That the genuine Irishman is second to no one when properly treated was clearly demonstrated in a paper "On the Development of Irish Industries," by Mr. J. C. BLOOMFIELD, read before the Society of Arts on Wednesday evening, in which he remarked that he had been privileged to act a subordinate part in developing the idea of the practicability of extending the system of "Home Industries," as existing on the Continent, to Ireland; and he was successful in allaying fears, at first generated, as to the possibility of establishing anything of the sort in Ireland, from his own actual experience. One point urged was that Irishmen were too mercurial—out of Ulster of course—and that a continuous course of training and work was inconsistent with the Celtic character. To this he replied with the practical test of the Irish pottery which he had the honour of originating and producing, and this memorial (a silver trowel) of the commencement of a ceramic manufacture in Ireland, calls attention to the fact that near a quarter of a century has elapsed since, on a hill in Fermagh, he first found kaolin and felspar, and then and there registered a vow that he would, if he lived, have a china manufacture in the village of Belleek, one of the poorest hamlets in Ireland, filled with ragged children, whose maximum of art lay in the making of mud pies in the streets.

The admirable intention here indicated Mr. Bloomfield has thoroughly accomplished. The shirtless brats, then apprenticed, and commenced manufacturing life by turning the jigger, were now artisans in broadcloth, and receiving wages up to 3*l.* 10s. per week—the maximum earned by a splendid young man in the sanitary ware department, taken out of the Ballyshannon workhouse. Well, here is some food for reflection. An amateur mineralogist, dropping upon a raw material on a mountain side, possessed of an obstinate and determined spirit—brought about by searching for and meeting kindred spirits—lives to exhibit these lasting exemplifications of what the Irish Celt could be brought to, and to tell the story of hundreds of youths being lifted from the gutters to be able to hold their place in a gathering of first-class artisans in china manufacture. Whatever may become of "Belleek" in the future, it has taken its place as a special ware. He don't for one moment bring these matters forward as precedents for imperial aid in this direction, as the results to himself were worse than *nil*. You will find, indeed, few Irishmen so patriotic as to subscribe 4700*l.* and give three miles of land to secure transit for a contemplated manufactory, having previously given the site and 200-horse power for 3*l.* per annum. No, his experience if terribly earned, enables him to see that, while it conclusively proves the adaptability of the Celt to become a manufacturing artisan under the most trying circumstances of isolation from technical training, at the same time, a large and sudden expenditure on forced manufactures would but end in calamitous failure, without touching the circumstances of the only class which requires immediate attention and assistance.

With the assistance of Mr. R. W. Armstrong, the present partner and manager of Belleek, and the late Mr. David McBirney, who found the capital, Mr. Bloomfield set to work, and the result has been that he has lived to see a wretched hamlet inhabited by squalid occupiers of hovels unfit for human life grown into a town with some 60,000*l.* to 70 000*l.* expended in and about it. The manufactory at Belleek not only comprises the necessary compartments for carrying on the work of a first-rate establishment, but, in the elevation and details, exhibit the head and hands of an architect and machinist, who, unlimited by the capitalist, has erected a building second to none in the kingdom; its pediment in plate glass, and vast masses of cut stone in mixed black limestone and mill-grit, show, in admirable relief, the produce of quarries in the locality; while the magnificent wheel, the work of Sir W. Fairbairn, and the application of every modern machine and plant calculated to secure the highest results at the least amount of labour, not only render this first attempt at Irish and ceramic production useful as a development of the resources of the country, but combine with it a practical illustration of the progress of science in this relation, giving the best practical opportunity for the apprentice to be advanced to a high pitch of working knowledge on his reaching the position of an artisan. Original china is made from the local mineral felspar, as against the soft stoneware of England. Sanitary ware is turned out, against which the proprietors challenge Staffordshire to compete, and decorative, though not extending in its aims to the universally acknowledged supreme head of the world's potteries—Minton—yet evincing a perfection to a certain point which leaves little to be desired; and it is not the least interesting aspect of this new industry to find the artisan holding the middle-class position, and exhibiting it in their clothing, while yet their fathers, never able to emerge beyond their original position of labourers, are still contented with inferior dwellings and dress complete the contrast between Belleek in 1850 and at the present time. The paper throughout is highly instructive with regard to the subject of which it treats, and cannot fail to be highly gratifying to every really patriotic Irishman.

As the development of Irish industries is here under consideration it will not be out of place to refer to a very valuable paper read before the Royal Dublin Society some nine months since by Messrs. Philip Argall, of the Duchy Peru Mines, Cornwall, and Gerrard A. Kinahan, under the title of Notes on the Recovery of Copper from its solution in main drainage, with special reference to the Wicklow mines. After briefly explaining the method of precipitation and general working adopted at other mines and metallurgical works, Messrs. Argall and Kinahan give full details of the process used at the Ovoca mines. They remark that in the general treatment of ores by wet or hydrometallurgical methods three stages or principal operations are recognisable. Firstly, the treatment of the ore, generally sulphide, in order to render the copper salts soluble in water, in dilute acid or in a solution of some salt; secondly the solution of the copper salts, as chloride or sulphate, and sometimes the purification of the solution by removing either the more valuable or the more injurious ingredients; and thirdly the precipitation of the copper, usually as the metal or as sulphide, and often an after treatment of the liquors for the recovery of the other salts in solution. The paper displays evidence of careful research, and will be useful to the hydrometallurgist by enabling him readily to see which process is the best adapted to the particular ore he has to deal with. That the mineral resources of Ireland are capable of profitable development, provided a fair amount of capital and moderate skill be applied to the work, has never been disputed, and the beginnings indicated by the papers of Mr Bloomfield and of Messrs. Argall and Kinahan certainly show that no fear need be entertained that the labour question will ever interfere in Ireland with the attainment of complete success.

IMPROVED MINERS' SAFETY LAMPS.

A safety lamp, constructed according to the invention of the Bessèges of Mines Colliery Company (Compagnie Houillère de Bessèges) has an external removable metallic case which protects the gauze or grating of the lamp against injury or dirt; this case terminates at its upper part, in a horizontal grated, perforated, or reticuled cover. In place of the small horizontal diaphragm of the Mueseler lamp it has a truncated cone of perforated or reticulated material exposing a large surface. The chimney is carried by a metallic washer or gallery, which supports it in position over the flame. Holes are provided in or near the base of the metallic case for the inlet of air to support combustion in the lamp. In one form of safety or miners' lamp, according to this invention, the base of the lamp forms the reservoir for oil, and carries a burner, which is surrounded by a cylinder of thick glass. This glass is protected from fracture by a cage of bars, upon which is mounted a ring forming the lower termination of the external metallic case of the lamp, which at its upper end is closed by a perforated or reticulated cover and bears a deflecting plate and a hook and handle. The chimney is supported by a metallic washer or gallery mounted on the glass cylinder, and is enclosed at its upper portion by two covers or casings of perforated or reticulated metallic material. Sometimes the upper part of the chimney is enclosed by the outer of these covers or casings only, and the inner casing only extends to its central portion or thereabouts.

The air enters the lamp by holes in the base of the external case, passes through the lower portions of the two internal perforated or reticulated covers or casings, and enters the glass cylinder to support the flame. The products of combustion pass up the chimney into the interior of the inner perforated or reticulated casing or cover, or into the space between the two perforated or reticulated casings or covers, according to the construction of the lamp and escape through the second casing or cover, and through the perforated or reticulated top of the external metallic case.

The chief advantages of the improved lamp are that it does not become extinguished if placed in an inclined attitude, even if it be an ascending current of air; that it will not communicate the explosion to the external atmosphere if placed in a gaseous current even of great velocity, and that it will not cause explosion in external atmosphere when placed in an explosive mixture of air and lighting gas.

Mr. H. Woodburn Kirby, the liquidator of the Rio Malagon Sulphur, Copper, and Silver Mines announces the payment of a third and final dividend of 4s. per share on and after March 19, making a total distribution of 3*l.* 14s. per share on the 5*l.* shares.

Lectures on Practical Mining in Germany.

CLAUSTHAL MINING SCHOOL NOTES—No. CCXII.*

BY J. CLARK JEFFERSON, A.R.S.M., WH. SC.,
Mining Engineer, Wakefield.
(Formerly Student at the Royal Bergakademie, Clausthal.)

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THE MAN ENGINE, OR FAHRKUNST.

The first proposal of an apparatus for raising and lowering the miners in metalliferous mines from and to the deep workings appears to have been made by Herr Dörrel, manager of one of the Clausthal mines in the year 1833. The great depth to which the Harz mines had already reached entailed a very considerable strain on the miners in simply getting to and from their work. So great, indeed, was the inconvenience that it was proposed that in the deeper mines the workmen should stay down several days consecutively. To the encouragement given by Herr Bergrath Albert, then Director of Mines at Clausthal, the practical carrying out of Dörrel's proposal is due, and in the year 1833 two pump rods in the Spiegelthaler Hoffnung's shaft were fitted up as a man engine, and driven by means of a previously disused water wheel. Although it is probable that Dörrel's was an independent invention, and certainly the first proposed and employed to raise and lower men into the mine, the principle of the man engine is of much older date. In 1694 Christopher Polhammer introduced a Fahrkunst in the mines at Fahlun, in Sweden, for raising the mineral. To two vertical rods having alternate movements brackets were attached, having hooks hinged at the ends which were free to lift from an horizontal position, but which were prevented from moving downwards past the horizontal position. These hooks caught beneath the bow handle of the vessel containing the mineral, which was thus raised alternately by the two rods. The arrangement served, as will be evident from its construction, only for raising the mineral. The empty vessels were lowered into the mine by an endless rope or chain. A very similar arrangement is said to have been introduced into one of the Liége mines by Hubert Sarton in the year 1776, and, like Polhammer's, served only for raising minerals. In the year 1834 Mr. Charles Fox offered a premium for an improved means for raising and lowering the miners to and from their work, and in 1842 the first man engine in England was erected in the Tresavean Mine, Cornwall, by Moissenet.

SYSTEMS.

There are two distinct systems on which man engines can be arranged, and in some cases these have been combined.

1.—DOUBLE-ACTING MAN ENGINES.

In this arrangement there are two rods with a vertical reciprocating motion, so that when the one is at the top of its stroke the other is at the bottom of its stroke; the one rod descends whilst the other ascends. On account of having two rods this system is sometimes denoted merely as a double man engine.

2.—SINGLE-ACTING MAN ENGINES.

These have only one moving rod, fixed platforms being provided in the shaft on which the miners stand, whilst the rod is moving in the direction in which the miner does not desire to travel.

Besides the above arrangements man engines may be classified according to the mode in which they are driven. The general mode is to connect the vertical rods by means of balance bobs and long connecting rods to a crank pin, so that the movement of the vertical rods is that of a rectilinear reciprocating motion derived from a uniform circular motion. In Belgium and France the method of attaching the rods direct to the piston rod of a steam or hydraulic cylinder seems to be preferred.

DOUBLE-ACTING MAN ENGINES.

1.—The steps or platforms attached to the rods are placed apart at distances equal to twice the stroke of the rods. This is the most usual arrangement. The miner in ascending or descending steps in alternate succession on every foothold or platform of both rods. If the platforms are only large enough to carry one man the miners cannot ascend and descend simultaneously. Since, however, it may often happen that only a few persons may be wishful to ascend and descend at the same time, fixed platforms are placed at greater intervals in the shaft, so that when two or three persons who may be descending meet others ascending, the former must reascend to the first fixed platform, and remain there till the ascending miners have passed them. Where the platforms are large enough to carry two persons it is usual to arrange that the miners in descending shall keep to one side of the platforms, and in ascending shall keep to the other side. Since the ascending and descending miners pass each other in opposite directions side by side at the change of stroke, it is advisable to divide the platforms by a rail or other light partition in order to avoid accidents. The number of platforms on each rod is equal to the depth of the shaft, divided by twice the length of the stroke. The time, therefore, occupied by a miner in ascending or descending, expressed in minutes, is equal to the number of platforms divided by the number of complete up and down strokes per minute. Since one man can stop on to the man engine at every stroke, the total time occupied in raising or lowering any given number of men will be equal to the time required for raising one man, plus the time occupied by the engine in making $(n-1)$ strokes where n represents the number of men; this additional time, expressed in minutes, is obtained by dividing $(n-1)$ by the number of strokes per minute. If there are a greater number of miners to ascend or descend in immediate succession than there are platforms, then for a certain number of strokes all the platforms on the rod will be occupied; this number of strokes is equal to the excess of the number of miners over the number of platforms. When the platforms are large enough to carry two persons, the time occupied by these in ascending or descending is equal to the time that would be occupied by one miner in ascending or descending (as given above), plus the time occupied by the engine in making half $(n-2)$ strokes where n represents the total number of miners. Similarly if the platform is large enough to hold three men at a time, the total time occupied in raising or lowering this number of men is equal to the time that would be occupied by one miner, plus the time required by the engine in making one-third $(n-3)$ strokes where n represents the total number of miners.

2—The steps or platforms attached to the rods are placed at distances apart equal to the length of the stroke. The miner, in ascending or descending, steps in alternating succession not on every but on every alternate foothold or platform of both rods; the miners can ascend and descend simultaneously with this arrangement. To avoid accidents and to allow of the miners ascending or descending simultaneously, the miners must always keep one succession of steps for ascending, and the other for descending. The miners pass each other whilst the rods are moving. As in the first case, the platforms may be made large enough to carry two or more persons. The number of platforms or footholds on each rod is equal to the depth of the shaft divided by the stroke of the rods; the time, therefore, occupied by a miner in ascending or descending is equal to half the number of the platforms divided by the number of complete strokes per minute; and the total time occupied in raising any given number of men will be equal to the time occupied in raising one man, plus the time occupied by the engine in making $(n-1)$ complete strokes where n is the number of men to be raised or lowered. The above supposes that one alternate succession of steps is set apart for miners ascending, and the other for those descending. If the man engine is not to be simultaneously for ascending and descending, then all the steps may be used—one half by one half of the men, and the other half by the other half of the men. Then the total time required to raise or lower any given number of men is equal to the time required to raise one man, as given above, plus the time occupied by the engine in making one-half $(n-2)$ strokes where n represents the number of miners.

SINGLE-ACTING MAN ENGINES.

In these the distance apart of the steps attached to the moving rod, likewise of those fixed in the shaft, is equal to the stroke of the rod. The miner, in ascending steps on to the lowest foothold of the rod when the latter is at the bottom of the stroke, is then raised with the up stroke of the rod. When the latter arrives at the top of its stroke the miner steps on to the first foothold fixed in the shaft, and waits there whilst the rod makes the down stroke. When the rod reaches the bottom of the stroke the miner then steps on to the second foothold fixed to the rod, and is raised on the succeeding up stroke to the level of the second platform fixed in the shaft. In ascending the miner thus makes all the up strokes with the rod, and remains stationary on the fixed footholds in the shaft whilst the rod is making the down strokes. In descending the miner makes all the down strokes with the rod, but remains stationary during the up strokes. The number of platforms on the rod is equal to the depth of the shaft, divided by the length of a stroke. The time, therefore, occupied by a miner in ascending or descending is equal to the time occupied by the man engine in making as many complete strokes as there are footholds on the rod. Since when there are a considerable number of men, one can step off or on to the rod with each succeeding stroke, the total time required to raise a given number of men is equal to that required to raise one man, plus the time required by the man engine to make $(n-1)$ strokes where n represents the number of men to be raised. If the platforms are made so large that two men can ascend simultaneously, the time occupied in raising a given number of men is equal to that required to raise one man, plus the time required by the man engine to make one-half $(n-2)$ strokes where n represents the number of men to be raised.

Single-acting man engines can be used simultaneously for ascending and descending if the footholds on the rods and the platforms fixed in the shaft are made wide enough to carry two men; when so used the descending miner steps off the foothold on the rod on to the fixed platform, whilst the ascending miner steps from the fixed platform on to the foothold on the rod when the rod is at the bottom of its stroke, and *vice versa* when the rod is at the top of its stroke.

Should one of the miners, when several are ascending or descending together, fail to step over at the end of the stroke, he must remain in his position whilst the man engine makes a complete stroke, and then step over when the rod comes again to the same position; the only harm done is that this interruption is transferred in succession to all those following him.

* Being Notes on a Course of Lectures on Mining, delivered by Herr Bergrath Dr. VON GRODDECK, Director of the Royal Bergakademie, Clausthal, the Harz, North Germany.

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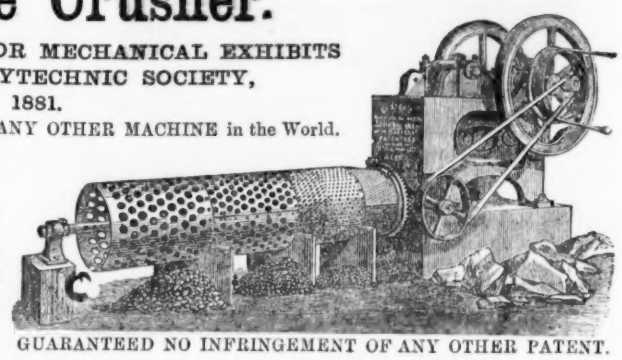

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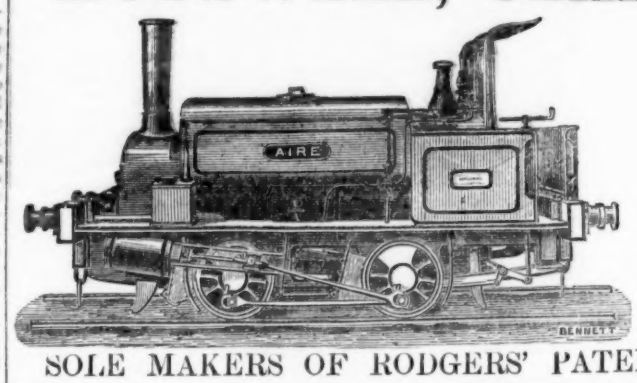

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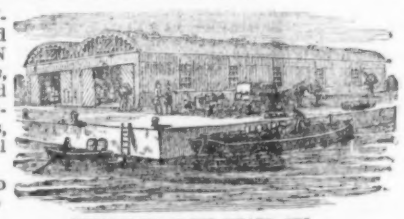

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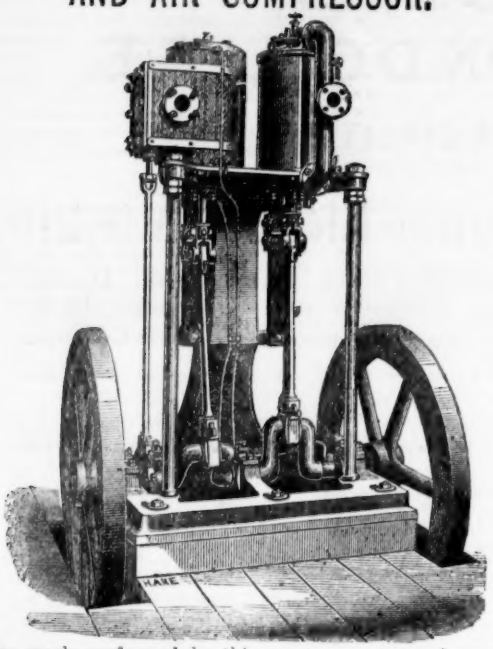

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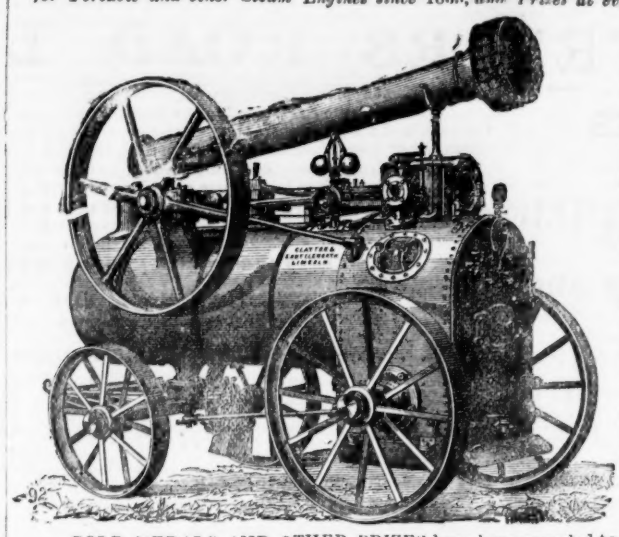

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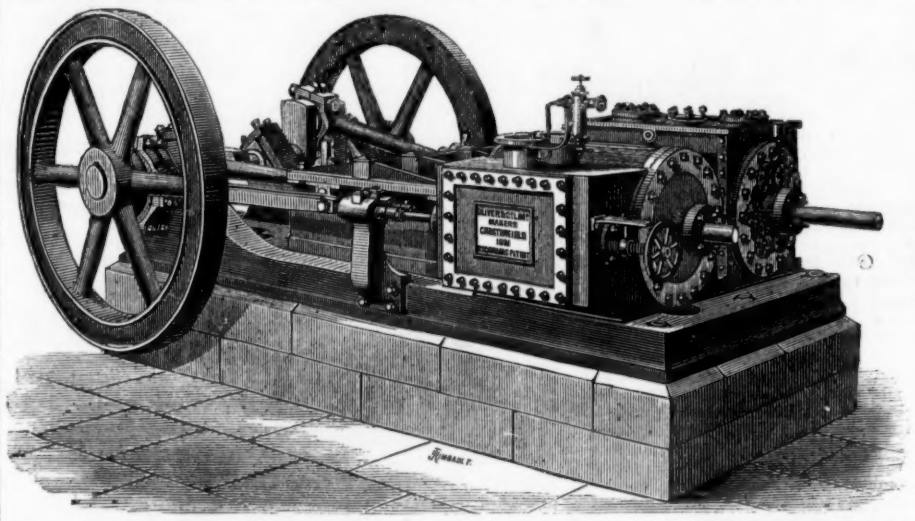

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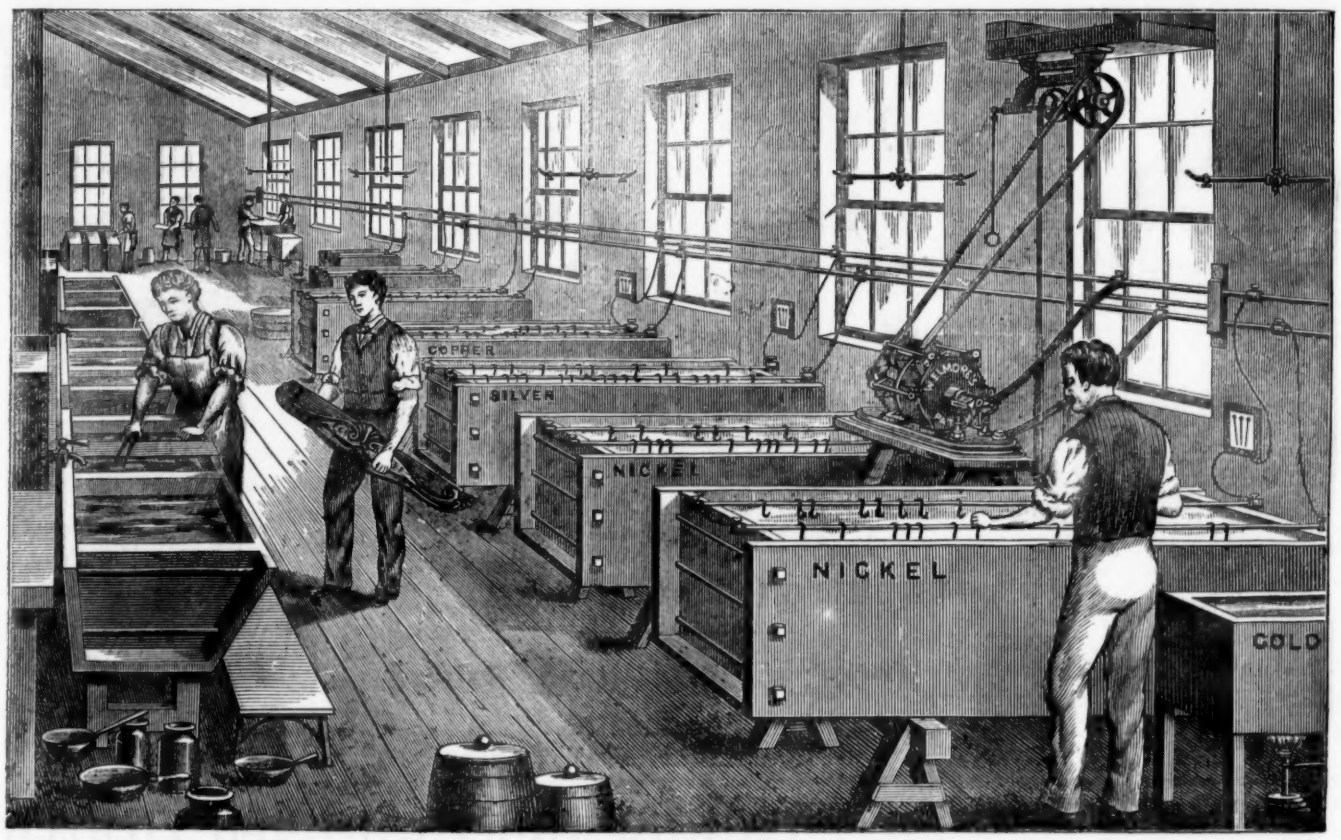

The above represents an Electro-Plating Works in which an "ELMORE" PATENT DYNAMO-ELECTRIC MACHINE is being used for the simultaneous deposition of Nickel, Silver, Copper, Bronze, Brass, Gold, Tin, Zinc, &c., from their Solutions.

TESTIMONIALS, &c.

From the "HARDWARE TRADE JOURNAL."
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"Mr. WILLIAM ELMORE, of 91, Blackfriars Road, London, S.E., is busily engaged fitting up the Art Metal Depositing Works of the Electrolytic Company, Charlotte Street, Blackfriars. The Electro-plating tanks of nickel, copper, brass, zinc, and tin, holding several thousands of gallons each (worked by an 'Elmore' Patent Dynamo-Electric Machine, capable of depositing about 500 lbs. of metal per day), and the specially designed and constructed polishing machinery will all combine to constitute this most gigantic and complete arrangement of the kind in the world. Here boiler tubes, each over 20 ft. in length, may be coated with copper, large ornamental iron lamp posts, and similar massive iron structural objects of great weight may be covered with electro-deposited copper, forming, when finished, a complete shell of bronze, which may be nickel-plated, or even silver-plated, if desired. Large rough or polished iron surfaces may be coated with brass, or zinc, or tin. Copper electrotype copies are taken of art subjects, the reproduction being so perfect that the process is used for multiplying plates from which bank-notes are printed, and the most delicate ferns, flowers, leaves, and insects are coated with copper, and afterwards with gold, silver, nickel, &c., for use as ornaments of various kinds. Fenders, fire-irons, grates, &c., may be brassed. The largest marine engines may be nickel-plated in the large nickel-plating plant, worked by the powerful 'Elmore' machine with ease and certainty, which only a few months since would have been pronounced almost impossible. The Electrolytic Company, we understand, express perfect satisfaction with the work already completed by Mr. Elmore, and there is no doubt that with that gentleman's large practical experience the company could not have been in better hands. The entire premises will be lighted by the 'Elmore' system of electric light."

From the "LONDON MINING JOURNAL."

"The new 'Elmore' Dynamo-Electric Machine can be seen in operation in London, and is considered one of the most wonderful scientific apparatus which has yet been brought before the public; it should be inspected by all who are interested in any kind of metallurgical operations."

"Mr. ELMORE has just received two pieces of ordnance from Her Majesty's Works at Chatham, with an order to nickel-plate the same, together with the carriages upon which they are mounted. Mr. Elmore has done similar work for the Government on previous occasions, and it will be remembered that the screw propellers used on the torpedo boats were nickel-plated by him. The 'Elmore' Dynamo-Electric Machines and complete electro-plating outfits have been supplied to Government Departments at home and abroad."

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ART METAL DEPOSITING WORKS,
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From the LONDON NICKEL PLATING COMPANY.

"We have much pleasure in expressing our entire satisfaction with the nickel-plating solution, anodes, and Dynamo Machine that you have supplied us with.

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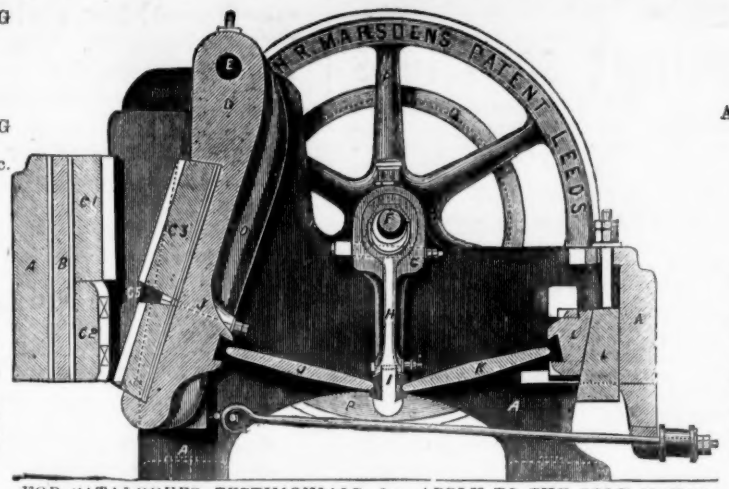

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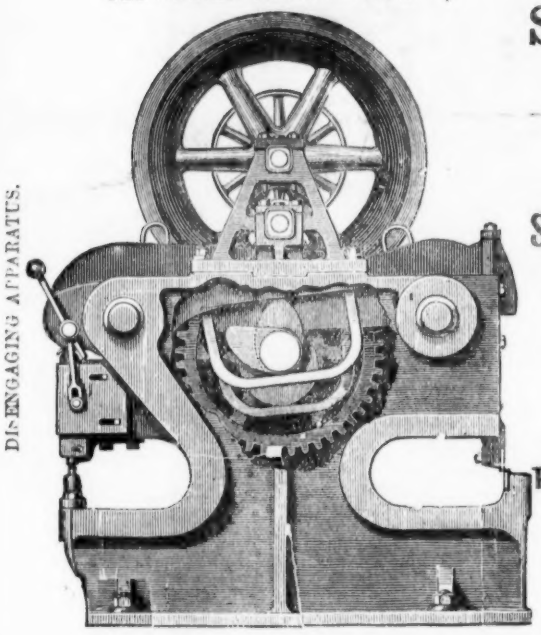

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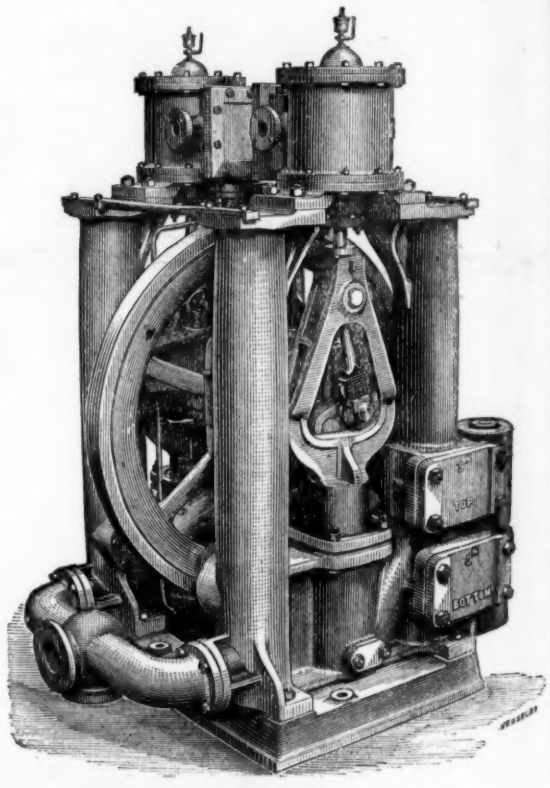

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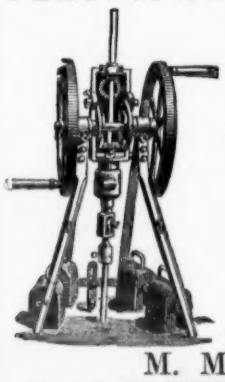

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